

February 1948

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office

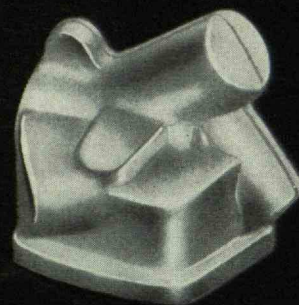
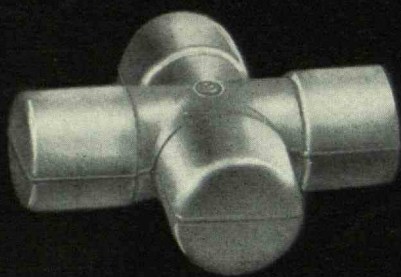


technology review

Published by MIT

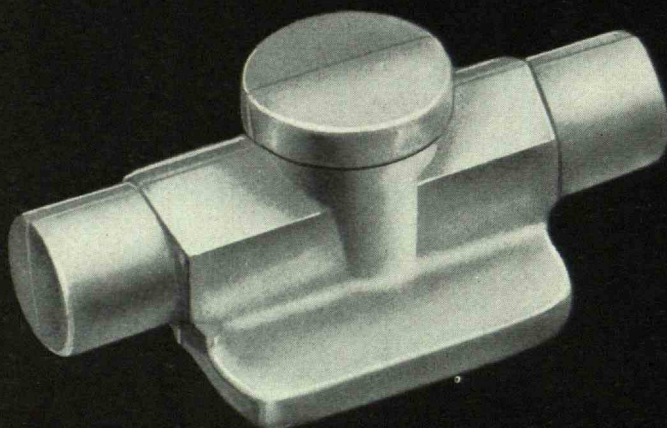
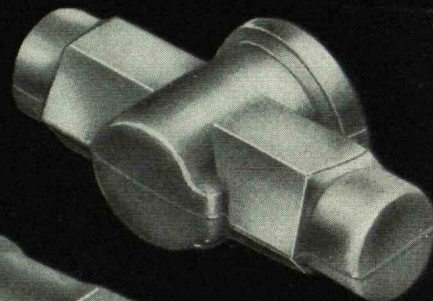
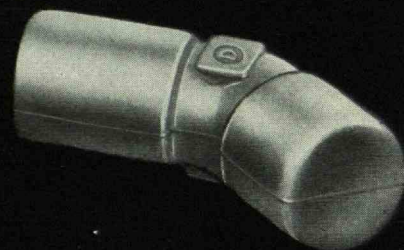
This PDF is for your personal, non-commercial use only.
Distribution and use of this material are governed by copyright law.
For non-personal use, or to order multiple copies please email
permissions@technologyreview.com.

FOR MAXIMUM STRENGTH



FORGED

**VALVE BODIES—FITTINGS
OF NON-FERROUS METALS**



HARVEY

METAL CORPORATION

HAROLD B. HARVEY '05 • *Engineers & Manufacturers* • SHERRY O'BRIEN '17

74th STREET and ASHLAND AVENUE • CHICAGO 36, ILLINOIS

FORGINGS IN ALUMINUM • BRASS • BRONZE • COPPER • MAGNESIUM • MONEL • ALLOYS

MACHINING FACILITIES

Here's An Expense You CAN Control in these Days of Rising Costs



EYE ACCIDENT COSTS UP 78%

The tragic and *unnecessary* high costs of eye accidents can be cut—by a simple, effective eye protection program. One manufacturer of electrical equipment saved \$14,000 in two years by installing an eye accident prevention program. Why not stack your eye injury costs (obvious and hidden) against the modest cost of such a program—and see how far ahead you'll be! Your nearest AO Safety Representative can help you.



American Optical
COMPANY
Safety Division

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL INDUSTRIAL CITIES

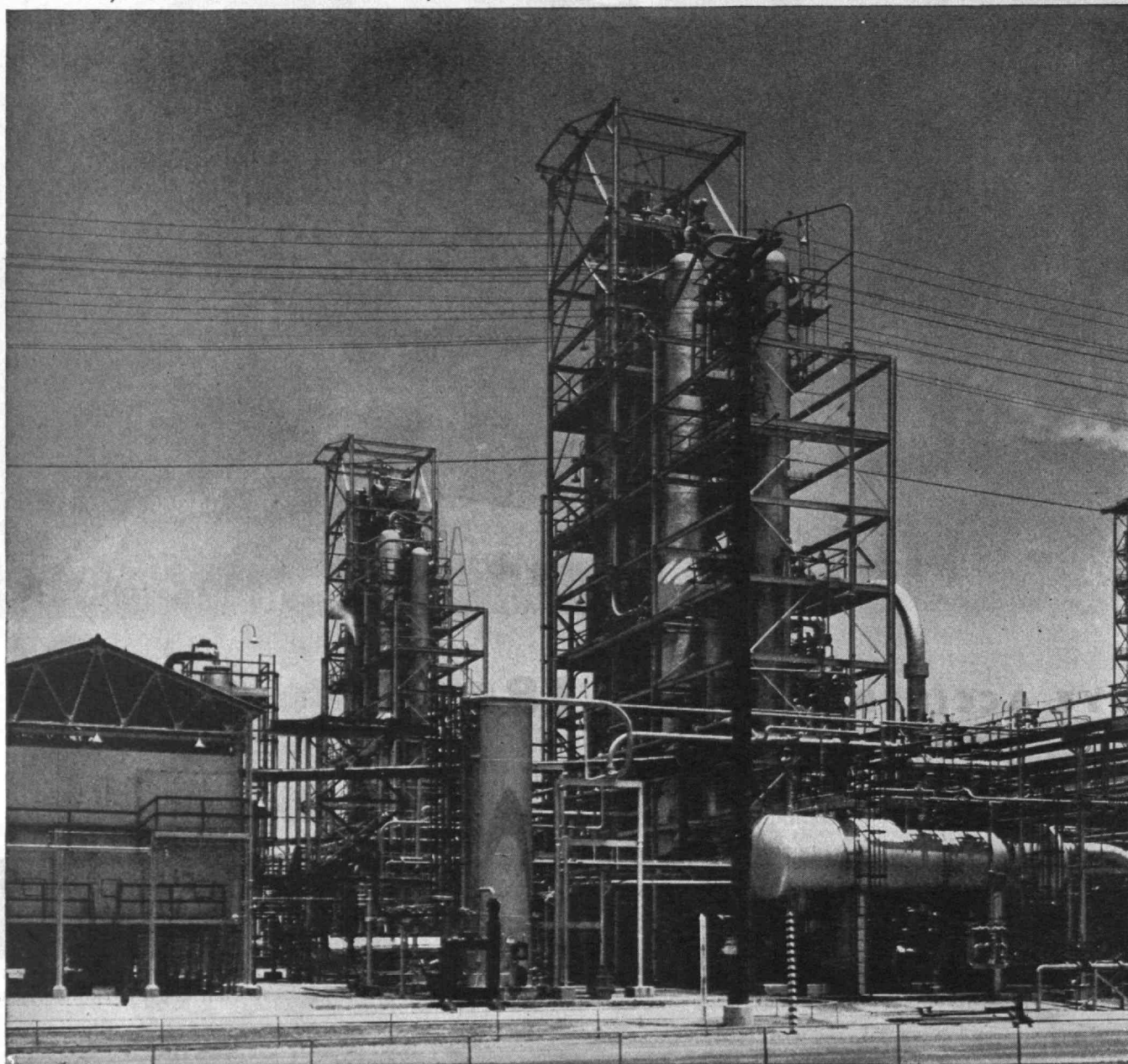
THE LUMMUS COMPANY
420 Lexington Avenue, New York 17, N.Y.

LUMMUS

CHICAGO—600 South Michigan Avenue, Chicago 5, Ill.
HOUSTON—Mellie Esperson Bldg., Houston 2, Texas
LONDON—78 Mount Street, London, W. 1, England

—an integrated service extending from engineering surveys of existing facilities and economic studies to the design, construction and initial operation of chemical process units and chemical manufacturing plants.

Ethylene Plant, 100,000 Pounds Per Day.



The Symbol of QUALITY in Grinding Wheels . . .

NORTON ABRASIVES

THIS symbol means a wheel made in the world's largest grinding wheel plant.

It means a wheel made by skilled workers — 10% of them Norton employees for 25 years or more.

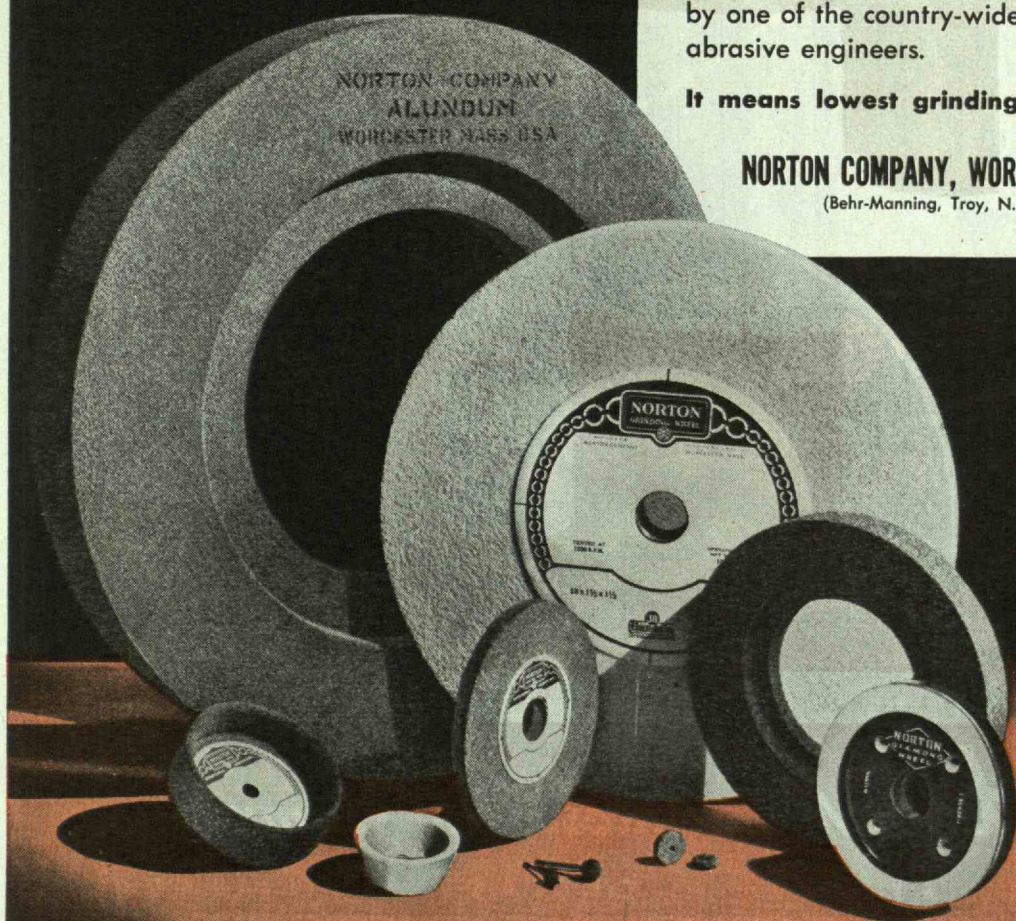
It means a wheel backed by the most extensive research facilities in the grinding wheel industry.

It means a wheel especially suited to each of your grinding jobs — expertly selected by one of the country-wide staff of Norton abrasive engineers.

It means lowest grinding costs for you.

NORTON COMPANY, WORCESTER 6, MASS.

(Behr-Manning, Troy, N. Y. is a Norton Division)



Abrasives - Grinding Wheels - Grinding and Lapping Machines - Refractories - Porous Mediums - Non-slip Floors - Norbide Products - Labeling Machines

"POLY-LITE"

EXTRUDED POLYSTYRENE SIDE SHIELDS BY SANDEE

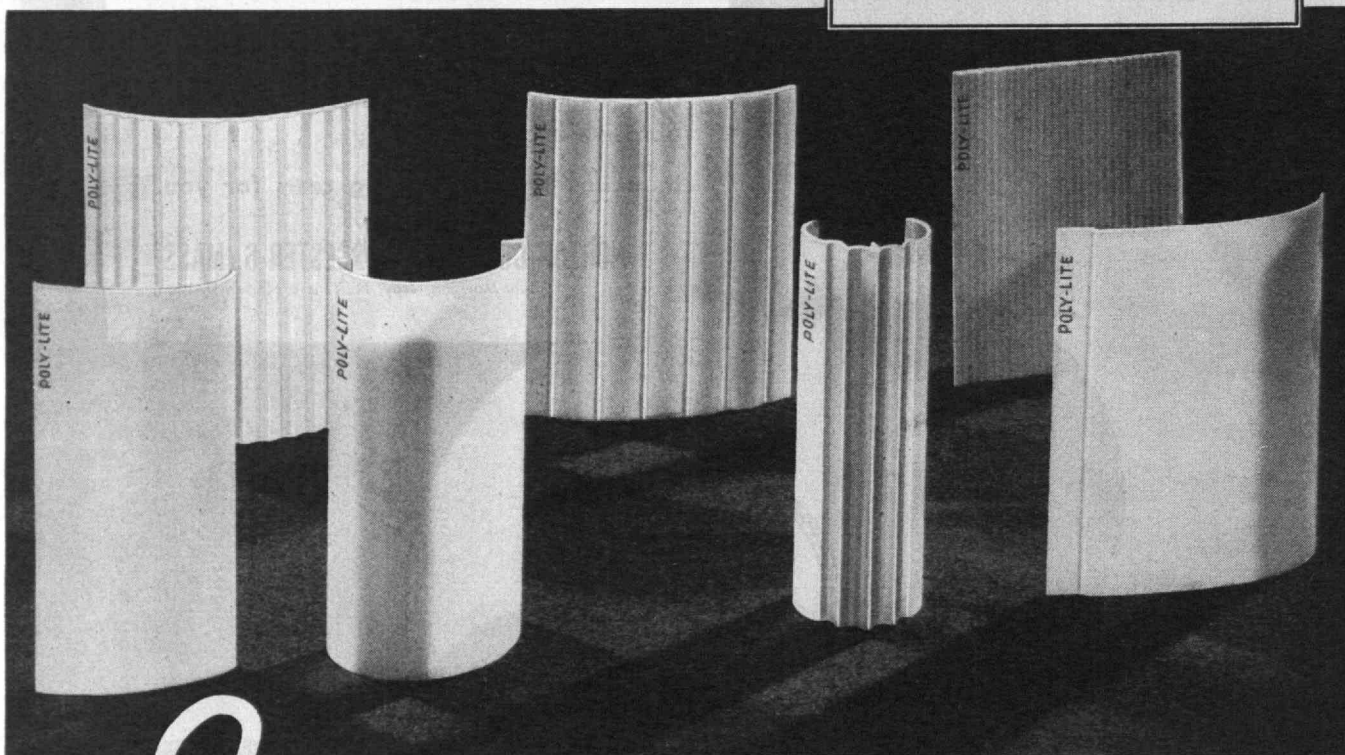
SANDEE chose "POLYSTYRENE" for the production of its "POLY-LITE" Fluorescent Light Sections because of its outstanding properties for this application. Study the properties listed here and you will agree that these features, plus Sandee technology, create a combination unequalled for the development of your new fixtures to give the maximum in aesthetic and functional lighting.

Sandee production experience plus the satisfaction of many customers verifies the choice of POLYSTYRENE for these Extruded Fluorescent Fixture Sections. This experience is available to you now without the necessity of an extended trial period—so contact Sandee on your new, modern highly efficient fluorescent fixtures.

"POLY-LITE" IS A GUARANTEE OF QUALITY

OUTSTANDING PROPERTIES OF SANDEE POLYSTYRENE

- | | |
|--------------------------|-------------------------|
| 1. Specific Gravity | —1.05 |
| 2. Tensile Strength | —5500 to 7000 P.S.I. |
| 3. Impact | —0.5 ft. lbs. (notched) |
| 4. Heat distortion | —175°F |
| 5. Rigidity | —Excellent |
| 6. Dimensional Stability | —Excellent |
| 7. Water Absorption | —Nil |
| 8. Burning Rate | —Slow |
| 9. Electrical properties | —Excellent |
| 10. Odor | —None |
| 11. Color | —Unlimited |
| 12. Finish | —High Gloss if Desired |



SALES REPRESENTATIVES IN 19 PRINCIPAL CITIES

Sandee Manufacturing Company

5050 FOSTER AVENUE • CHICAGO 30, ILLINOIS

EXTRUDED PLASTICS AND SPECIAL TOOLS

HELIUM ISOTHERM ON CABOT SPHERON 6

AT -269°C

CC'S OF HELIUM ADSORBED
PER GRAM OF CARBON BLACK

200

160

120

80

40

Cabot research on carbon black ranges from flame studies at 1800°C to adsorption properties at -269°C . Adsorption isotherms such as this are the first complete Helium isotherms ever obtained on carbon black at liquid Helium temperatures. They aid in understanding the structure of carbon black surfaces, and contribute at the same time to the world's fundamental knowledge of adsorption. They are an example of achievement in pure research at Cabot laboratories.



GODFREY L. CABOT, INC.

77 FRANKLIN STREET, BOSTON 10, MASS.

0

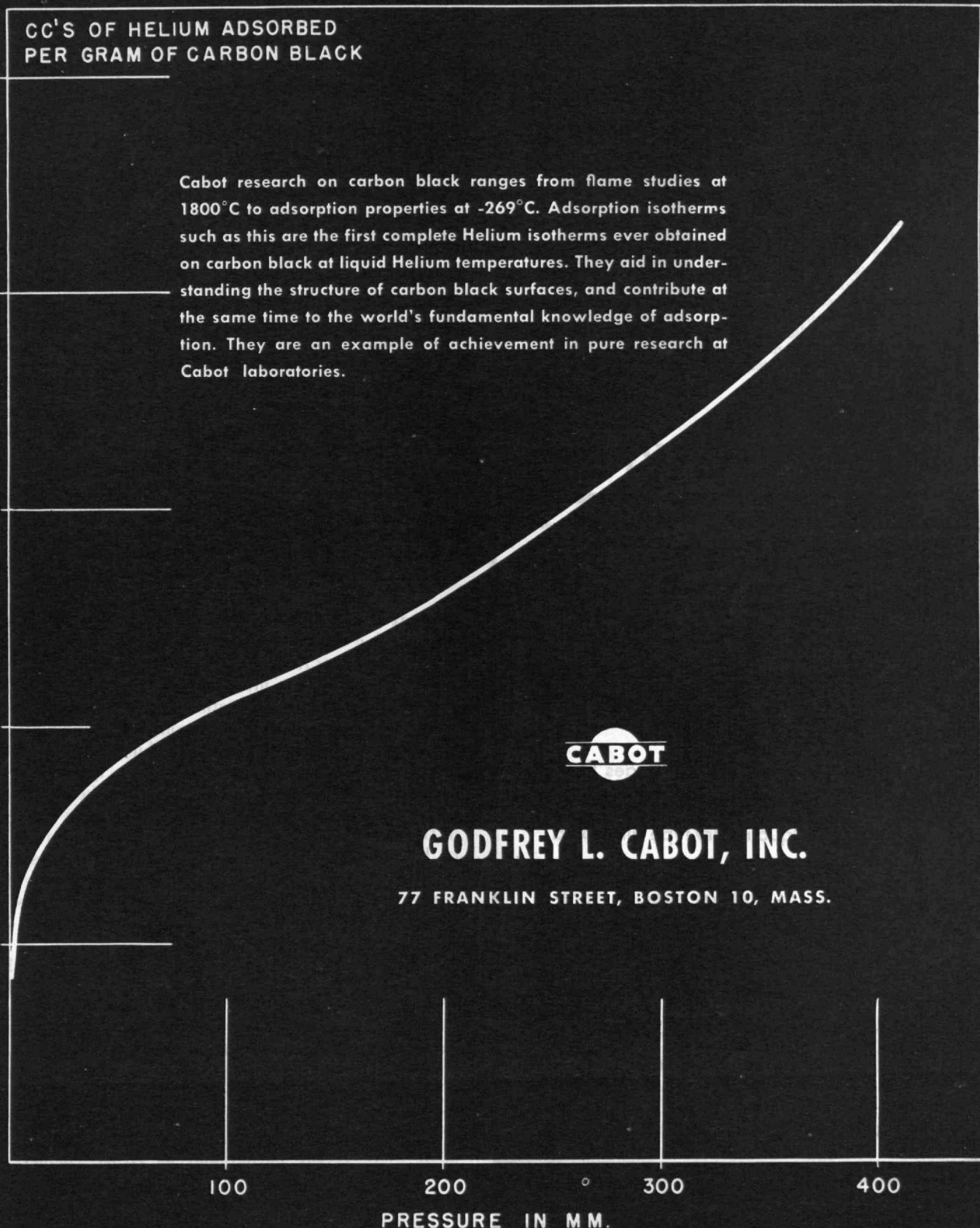
100

200

300

400

PRESSURE IN MM.

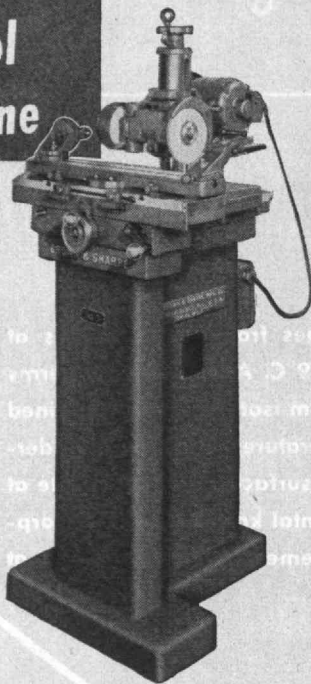


Developed to Save You Money

The NEW No. 5 Cutter and Tool Grinding Machine

• This new Brown & Sharpe machine is specifically designed for sharpening small cutters—especially end mills, reamers and similar tools—more efficiently. Its super-sensitivity speeds up set-up and operation. Its compact size saves on floor space and investment.

The following features typify the advanced engineering design of this new grinding machine... an ingenious, roller-bearing table and a double-ended ball bearing wheel spindle with super-precision, permanently-sealed, grease-lubricated bearings. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.



BROWN & SHARPE 

HEVI DUTY

Hevi Duty Electric Co. Surges Transformers

With the acquisition of the Surges Electric Company of Milwaukee, Hevi Duty can now offer quality dry type air cooled transformers with or without tap changing switches as well as special transformers for special requirements. An accelerated program of modernization will present opportunities for increased production and good delivery schedules.

Write for Bulletin S-4611

HAROLD E. KOCH '22, President

ELTON E. STAPLES '26, District Manager, Cleveland

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY
MILWAUKEE 1, WISCONSIN

THE TABULAR VIEW

About Physics.—The Review takes pleasure in presenting (page 201) the second of the lectures in memory of Arthur D. Little, '85, entitled "Physics in the Contemporary World" by J. ROBERT OPPENHEIMER, Director of the Institute for Advanced Study, Princeton, N. J. After receiving the A.B. degree from Harvard University in 1925, Dr. Oppenheimer studied at Cambridge University and Göttingen University, the latter of which conferred upon him the Ph.D. degree in 1927; he was National Research Fellow in 1927-1928 and International Education Board Fellow in 1928-1929. From 1929 until he became director of the Los Alamos Laboratory of the Manhattan Project, Dr. Oppenheimer was professor of physics at the University of California and the California Institute of Technology.

Conservation for Engineers.—In the January issue of The Review, the basic concepts of conservation were developed by DR. IRA N. GABRIELSON, President of the Wildlife Management Institute. Already the ripple of last month's message is widening, as is indicated in Mail Returns, page 192. In his second article Dr. Gabrielson points out (page 205) the relationship between engineering and conservation. Dr. Gabrielson has spent his entire professional life in studying and directing research on wild life, game management, and in furthering this nation's efforts in the conservation of natural resources. His article "Relation of Conservation to Engineering Projects" is one of two lectures delivered to students in the Department of Civil Engineering last spring.

Student Prize Papers.—M.I.T. is universally known as providing outstanding training in scientific and engineering subjects; it is not so widely known for its program of humanities, intermural and intramural athletics, and self-governed student activities—all of which are aimed to make well-rounded individuals of its students. As an indication of ability of first- and second-year students to wield a pen, or typewriter—as well as a slide rule—The Review publishes, without editorial changes, two papers from last year's winners of the Robert A. Boit Prize for the "most effective use of English" in written papers. The Boit papers are "Evitability of World War III" by FREDERIC B. KRAFFT, '49, (page 210) and "The Limitations of Technique" by WILLIAM S. EDGERLY, '49, (page 211).

Professional Aid.—In "Bridges or Stepping Stones?" (page 212) DUGALD C. JACKSON, '21, examines the problem of help offered to younger men by engineers of established reputation and maturity. In so doing he is guided not alone by the fine example set by the elder Dugald C. Jackson who was for almost 30 years head of the Department of Electrical Engineering; he also draws upon his career as successful educator and administrator in several engineering institutions and upon more recent background as Army colonel in World War II. To a considerable extent, at present, Colonel Jackson's activities are taken up in directing
(Concluded on page 192)



PEOPLE DON'T STANDARDIZE ON "SUBSTITUTES"

For nearly 15 years, molybdenum high speed steels have proved on their own merits that they are superior steels. Long before World War II, during the war, and up to the present moment, these steels have done more work for less money.

Molybdenum high speed tool steels, for instance, are not only tougher, and do more work per job, but are consistently cheaper than 18-4-1. In addition, they are from 6% to 9% less dense, so more tools may be made from the same gross weight of steel.*

Get the facts about what molybdenum high speed steels can do for you.

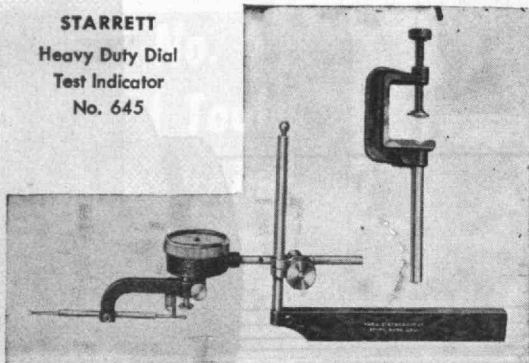
*FREE BOOKLET on molybdenum high speed steels gives proof of these statements. Write for it.

MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

Climax Molybdenum Company
500 Fifth Avenue • New York City

FOR RUGGED SERVICE

STARRETT
Heavy Duty Dial
Test Indicator
No. 645



For severe applications around machinery or for continuous use in general tool work, No. 645 has a special, spiral-type mechanism of unusually rugged construction. Combines sensitive, accurate action with easy-to-read dial. Available to read 0-50-0, 0-20-0, 0-40 or 0-100 by thousandths, range .200". For complete information see new Starrett Dial Indicator Catalog "L". Write for a copy.

Buy Through Your Distributor

THE L. S. STARRETT CO. • ATHOL • MASSACHUSETTS • U. S. A.

World's Greatest Toolmakers

STARRETT

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK
HACKSAWS • BAND SAWS FOR CUTTING METAL, WOOD, PLASTICS



A Challenge

Demands of industry are becoming more and more a challenge to the engineering skill of every manufacturer. Diefendorf welcomes that challenge in the design and production of gears—all metal and non-metallic, for special purpose units and standard production.

DIEFENDORF GEAR CORPORATION
Syracuse 1, New York

DIEFENDORF

GEARS

MAIL RETURNS

Specialization — and Delay

FROM GEORGE R. WADLEIGH, '97:

Your cover on the December, 1947, issue of *The Review* interested me greatly, first because it is an interesting composition and second because of the sea wall design.

The location is not given but presumably is somewhere along one of the coasts of this country. The design is of a "new" type here, perhaps not over 20 years old. The very interesting point is that in Herculaneum 2,000 years ago this same design is to be found on a sea wall, the Bay of Naples then abutting the city. Now this wall is a quarter to a half mile from any water.

Two thousand years is no doubt longer than the time required at present for a good feature developed in one industry to spread into another, but our present intensive development of specialists is making for much delay in this respect.

It is apparent from Dr. Compton's talk here on December 9 that he and the Faculty are much alive to the question of overspecialization. *New York 18, N. Y.*

Spreading the Word

FROM BENJAMIN P. RICHARDSON, JR., '26:

Dr. Ira N. Gabrielson's article "Concepts in Conservation of Land, Water, and Wild Life" in the January, 1948, *Review* was very interesting. If it is possible to obtain 200 copies of pages 149-153 I should be glad to spread the word to our junior club members. It might be another drop-on-the rock and prove productive to the cause. *Old Greenwich, Conn.*

Pleasant Words

FROM JOHN A. ZUBLIN:

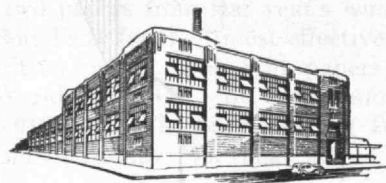
I am subscribing herewith to *The Technology Review* and enclosing my check. There is no need for you to send me this magazine on approval because if it is as good as M.I.T., then I want it and shall be anxious to read it. *Los Angeles 28, Calif.*

THE TABULAR VIEW

(Concluded from page 190)

the Boston campaign of the American Red Cross, but he looks forward to early resumption of his work in engineering, industry, and education.

**Speed with
Economy**



The Pullman Co.

If you have a *difficult* building problem, talk it over with us. In our 30 years of industrial construction, we have overcome many unusual conditions — both on new building and alteration work.

W. J. BARNEY CORPORATION
101 PARK AVENUE, NEW YORK
INDUSTRIAL CONSTRUCTION

Alfred T. Glassett, '20, Vice President

"Intellectual improvement arises from leisure"—SAMUEL JOHNSON



Why housekeeping gets "lighter" all the time

"...Woman's work is never done."

True enough. But today's homemaker—aided by her modern refrigerator, range, water heater, vacuum cleaner and other appliances finds more time for family and for leisure.

And what helps these "automatic servants" operate so dependably? *Better materials* for one thing.

Materials on the inside—the unseen working parts of household standbys. Such as alloy steels, new plastics, carbon brushes in motors... lighter, more compact materials, that make appliances stand up longer and handle with ease.

Materials, too, that you can see... as those stainless steel surfaces so easy to clean. Or the chemicals in more enduring waxes and polishes, varnishes and plastic finishes.

Yes, today's housewife enjoys new leisure, new freedom from drudgery... thanks to better materials.

Producing these better materials and many others—for the use of science and industry and the benefit of mankind—is the work of the people of UNION CARBIDE.

FREE: You are invited to send for the illustrated booklet, "Products and Processes," which describes the ways in which industry uses UCC's Alloys, Chemicals, Carbons, Gases and Plastics.

UNION CARBIDE

AND CARBON CORPORATION

30 EAST 42ND STREET **UCC** NEW YORK 17, N. Y.

Products of Divisions and Units include

LINDE OXYGEN • PREST-O-LITE ACETYLENE • PYROFAX GAS • BAKELITE, KRENE, VINYLON, AND VINYLITE PLASTICS
NATIONAL CARBONS • EVEREADY FLASHLIGHTS AND BATTERIES • ACHESON ELECTRODES
PRESTONE AND TREK ANTI-FREEZES • ELECTROMET ALLOYS AND METALS • HAYNES STELLITE ALLOYS • SYNTHETIC ORGANIC CHEMICALS

Car makers say, "No tire ever did what this one does!"

NEW SUPER-CUSHION RUNS ON 24 LBS. OF AIR; GIVES AMAZINGLY SOFTER RIDE, BETTER CAR HANDLING; CUTS WEAR ON YOUR CAR

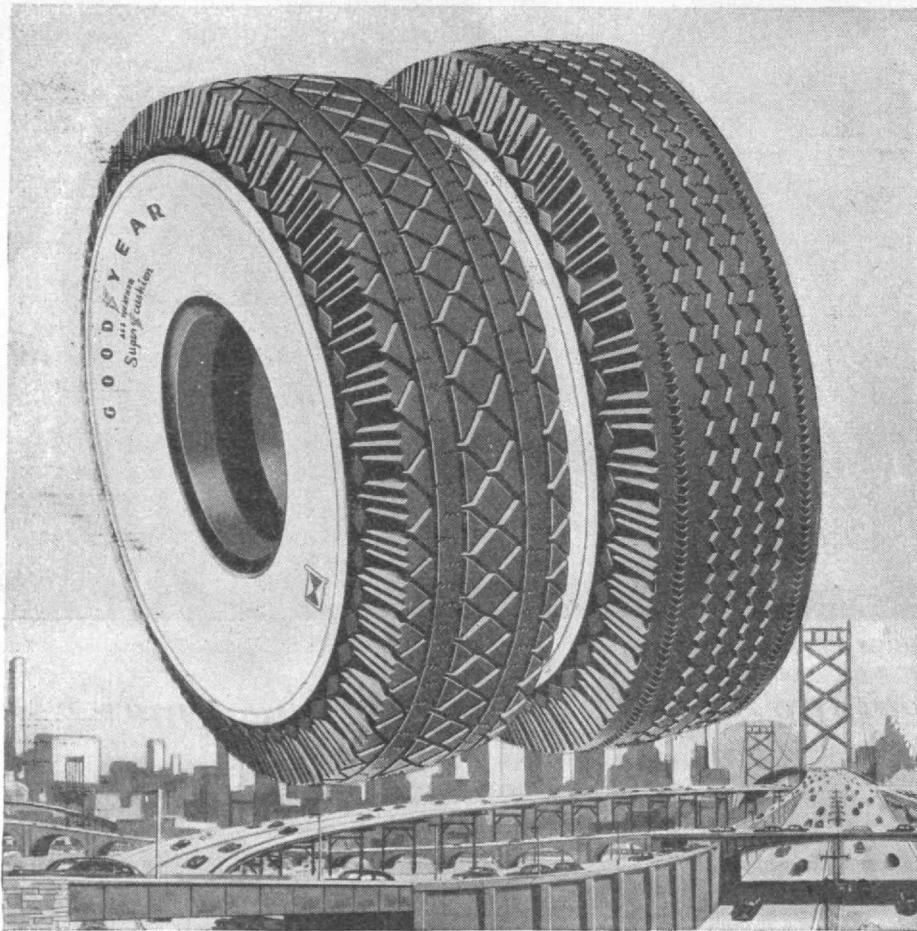


Auto makers couldn't believe any tire could do what Goodyear's Super-Cushion does till they tested it themselves. Then they said:

"This tire makes a great improvement in the performance of

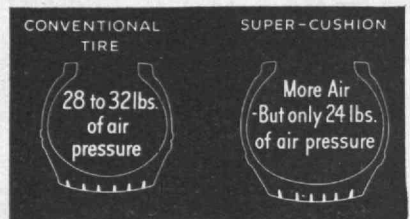
the modern motor car. It's the biggest tire advance in 15 years!"

They quickly ordered this new kind of tire for their new cars. Super-Cushions will do wonders for your car, too. Here are the reasons . . .



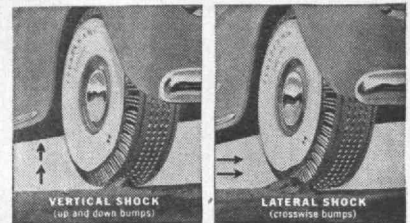
For the smoothest, safest ride you've ever had, more mileage and greater car economy, switch to Super-Cushions—whether your car is used or new. They'll make a big difference in its road performance. So see your Goodyear dealer now. If he doesn't have your size at the moment, he'll have it soon.

MORE PEOPLE RIDE ON GOODYEAR TIRES THAN ON ANY OTHER KIND



1. Softer ride—easier, safer car handling! The Super-Cushion is bigger and softer. It runs on only 24 pounds of air instead of 28 to 32.

You get a noticeably smoother, softer ride. And until you drive a car equipped with Super-Cushions, you can't imagine what ease and security they bring to car handling. Your car seems to hug the road, flow around turns!



2. Reduces rattles, cuts car repairs! Till Goodyear designed the Super-Cushion, lateral shock was one of the few problems yet to be licked in modern motor cars.

Pillowy Super-Cushions soak up these crosswise jolts, soak up vibration. This means less driving fatigue, less wear on your car, fewer rattles, fewer bills—longer car life!

3. Super-Cushions give greater mileage! Super-Cushions run cooler, build up less pressure. Because they're softer, they "roll with the punch," are harder to cut, bruise, or blow out.

Thus Super-Cushions consistently average more mileage than the finest standard tires!

Another Super-Cushion advantage: Because they're bigger, they improve the appearance of your car!

The new *Super-Cushion*
by **GOODYEAR**



Super-Cushion T. M.—The Goodyear Tire & Rubber Company



Photo by Frederic W. Norasick, '31

THE TECHNOLOGY REVIEW

TITLE REGISTERED, U. S. PATENT OFFICE

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY



Contents for February, 1948

WHITE CLOUD RIDING HIGH • Photograph by W. E. Peters, from Trains	THE COVER
ICE LADEN • Photograph by James H. Thomas	FRONTISPIECE 196
PHYSICS IN THE CONTEMPORARY WORLD	BY J. ROBERT OPPENHEIMER 201
<i>"Of all intellectual activity, science alone has . . . turned out to have the kind of universality among men which the times require."</i>	
RELATION OF CONSERVATION TO ENGINEERING PROJECTS	BY IRA N. GABRIELSON 205
<i>The structures of engineers become doubly valuable when conservation considerations are included in the planning of engineering projects.</i>	
INDUSTRIAL PATTERNS	209
<i>Symmetry in the products of technology and industry</i>	
EVITABILITY OF WORLD WAR III	BY FREDERIC B. KRAFFT 210
<i>A topic of current concern is analyzed in a paper written for last year's class in Sophomore English</i>	
LIMITATIONS OF TECHNIQUE	BY WILLIAM S. EDGERLY 211
<i>An undergraduate paper submitted for the Robert A. Boit Prize in the effective use of English</i>	
BRIDGES OR STEPPING STONES?	BY DUGALD C. JACKSON, JR. 212
<i>Too much guidance of young engineers may defeat its purpose</i>	
THE TABULAR VIEW • Contributors and Contributions	190
MAIL RETURNS • Letters from Review Readers	192
THE TREND OF AFFAIRS • News of Science and Engineering	197
THE INSTITUTE GAZETTE • Relating to the Massachusetts Institute of Technology	213



Publisher • H. E. LOBDELL

Editor • B. DUDLEY

Business Manager • R. T. JOPE

Editorial Associates: PAUL COHEN • T. L. DAVIS • J. R. KILLIAN, JR. • WILLY LEY • F. W. NORDSIEK

J. J. ROWLANDS • D. O. WOODBURY

Editorial Staff: THEODORA KEITH, RUTH KING

Business Staff: MADELINE R. MCCORMICK

Published monthly from November to July inclusive on the twenty-seventh of the month preceding the date of issue, at 50 cents a copy. Annual subscription, \$3.50; Canadian and foreign subscription, \$4.00. Published for the Alumni Association of the M.I.T.: Raymond H. Blanchard, President; H. E. Lobdell, Executive Vice-president; C. George Dandrow, John A. Lunn, Vice-presidents; Charles E. Locke, Secretary; Ralph T. Jope, Treasurer. Published at the Rumford Press, 10 Ferry Street, Concord, N. H. Editorial Office, Room 7-203, Massachusetts Institute of Technology, Cambridge 39, Mass. Entered as second-class mail matter at the post office at Concord, N. H. Copyright, 1948 by the Alumni Association of the Massachusetts Institute of Technology. Three weeks must be allowed to effect changes of address, for which both old and new addresses should be given.



Photo by James H. Thomas

Ice Laden

THE TECHNOLOGY REVIEW

Vol. 50, No. 4



February, 1948

The Trend of Affairs

What Can't They Can?

FOR years all kinds of foods and many different beverages have been preserved in cans. Strangely enough the prime necessity of life, water, has only recently been canned with success, despite a long-standing need for such a product. Water is so bland that the slightest off-flavor or odor caused by a canning process is objectionable. Furthermore, colloidal metal salts in canned water may produce an unpleasant haze. Also, rusting is apt to occur, particularly after cans of water have been opened and partially used. An additional problem is created by the expansion of water when it freezes, so that cans in which water has frozen may rupture. A ramification of this difficulty arises from the tendency of canned water to supercool. If subjected to low temperatures in a state of complete rest, a can of water may form a hollow cake of ice containing a central core of water (liquid state) even though the temperature may be well below the freezing point. Since ice is bulkier than water, continued freezing from the outside creates a tremendous pressure upon the watery core. Eventually this pressure breaks the ice, thereupon releasing a jet of supercooled water with a force that may be sufficient to pierce the can.

A need has always existed for an acceptable canned water for lifeboat rations and related uses, but only during World War II did this demand become sufficiently urgent to generate the necessary research. Such research made use at its inception of the beer can that was perfected a little more than a decade ago. Beer cans are made from decorated tin plate, and then, after assembly, are lacquered and coated on the inside with a special wax. Ultimately some standard cylindrical beer cans were used to can water for the armed forces, and a special rectangular can based on the same principles was also designed.

The next step was discovery of the fact that water rusts cans much more rapidly when at the neutral point,

pH7, than when slightly on the alkaline side of neutrality. To find a palatable water with the desired hydrogen ion concentration was not easy, as most alkaline waters have unpleasant tastes. After wide search, however, a spring was finally located that yielded abundant quantities of a water of acceptable flavor and with a pH of 8.5 after its temporary hardness had been removed.

The process ultimately perfected for large-scale water canning began with boiling of the special spring water for 15 minutes to precipitate deposits accounting for the temporary hardness, filtering off the precipitate, and then cooling the water to the 145 degrees F. filling temperature. The cans were prepared by rinsing with tap water that had been sterilized by ultraviolet irradiation. After filling and capping, the cans were pasteurized at 140 degrees F. for 20 minutes, in order to assure absence of harmful micro-organisms. The cans were then cooled to 100 degrees F., dried, dipped in wax to protect the exterior against corrosion, marked, and packed.

The problem of expansion upon freezing was solved by underfilling; the cans had a capacity of 14.75 fluid ounces, but only 11 to 12 ounces of water were placed in each. No solution was developed for the difficulty of supercooling. But rupture of containers due to supercooling must have occurred rarely, at most, under the actual practical conditions of use of the canned water. The success of the process is demonstrated by the observation that although approximately 4,000,000 cans of water were packed for the armed forces during World War II, virtually no reports of ruptured cans were received. Yet many of the cans must have been frozen repeatedly because they were used in emergency seat packs of aircraft operating at the low temperatures of extremely high altitudes.

The canned water was found to be completely acceptable as late as two years after packing. Thus the manifold canned foods and beverages long available have now been rounded out by a good canned water.

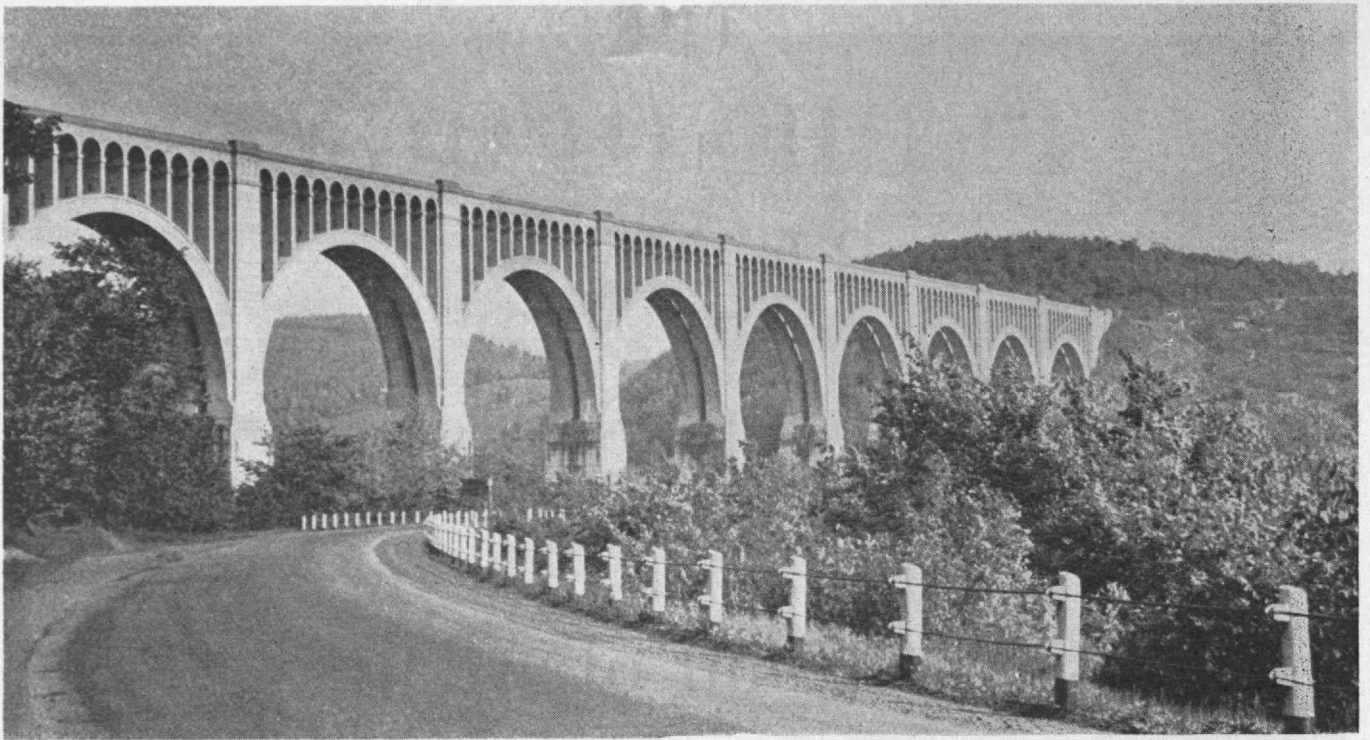


Photo by Martin J. Buerger, '24

Graceful arches are incorporated in the design of the bridge on the Scranton-Binghamton Highway which, in many respects, bears a strong resemblance to aqueducts built centuries ago by Roman engineers and road builders.



Photo by William W. Lewis, '89

"Ole Man River" serves as one of the country's principal inland waterways but the unpretentious structure shown here, at the Itasca State Park in Minnesota, is reputed to be the first bridge built across the Mississippi.

Progress — of a Kind

ATTENTION is focused rather sharply upon this country's oil supply if for no other reason than that at the present time the health and comfort of many of the nation's citizens are threatened by shortage of fuel oil during a winter which promises to be — and already has been — unusually severe. Part of the national shortage may be attributed to the new and increased uses for petroleum which, in recent years, have outstripped production capacity. It is reported, for example, that the present annual demand for oil products is 20 billion gallons more than the prewar peak of 1941, and seven billion gallons more than was consumed during World War II when an all-time high was reached. The armed forces, trucks and busses, private automobiles, railroads, air lines, and ships, and oil burners for domestic heating — each group of which alone uses more than two and a half billion gallons beyond its 1941 requirements — account for the largest increase of petroleum uses in recent years.

The critical oil situation emphasizes the delicate balance of our technological mode of living, and the ease with which thoughtless and perhaps irresponsible acts on the part of a comparatively small group can affect ad-

versely the comfort and health of a large portion of the nation's populace.

Strikes in the petroleum industry in Texas have left New England without fuel supplies adequate for assuring the maintenance of health, and have necessitated drawing upon government stocks. But work stoppages aggravate the situation in still other ways. Certainly a substantial number of the million or more oil burners which have been put into operation since 1941 for domestic use must have been installed, at least partly, to achieve freedom from the tragic periodic strikes which have characterized the coal industry. The inability of petroleum producers to increase production capacity as rapidly as is needed to fill current requirements is laid to shortage of steel which, in turn, has been traced to strikes in the coal industry.

To the extent that one segment of our population feels it can profit by refusing to recognize the welfare of the country at large, it is possible, theoretically at least, to bridge the gap of man-made deficiencies. But it is also necessary to assess the situation in terms of known petroleum reserves as well as of increased use. "The disappearance of the reserve capacity to produce natural crude oil in the United States is the most important difference between this country's prewar and postwar economic and security situation," says W. C. Schroeder, Chief of the Office of Synthetic Liquid Fuels, Bureau of Mines. Kirtley F. Mather, Professor of Geology at Harvard University, has stated that our proved oil reserves will probably reach a maximum by 1950 and there-

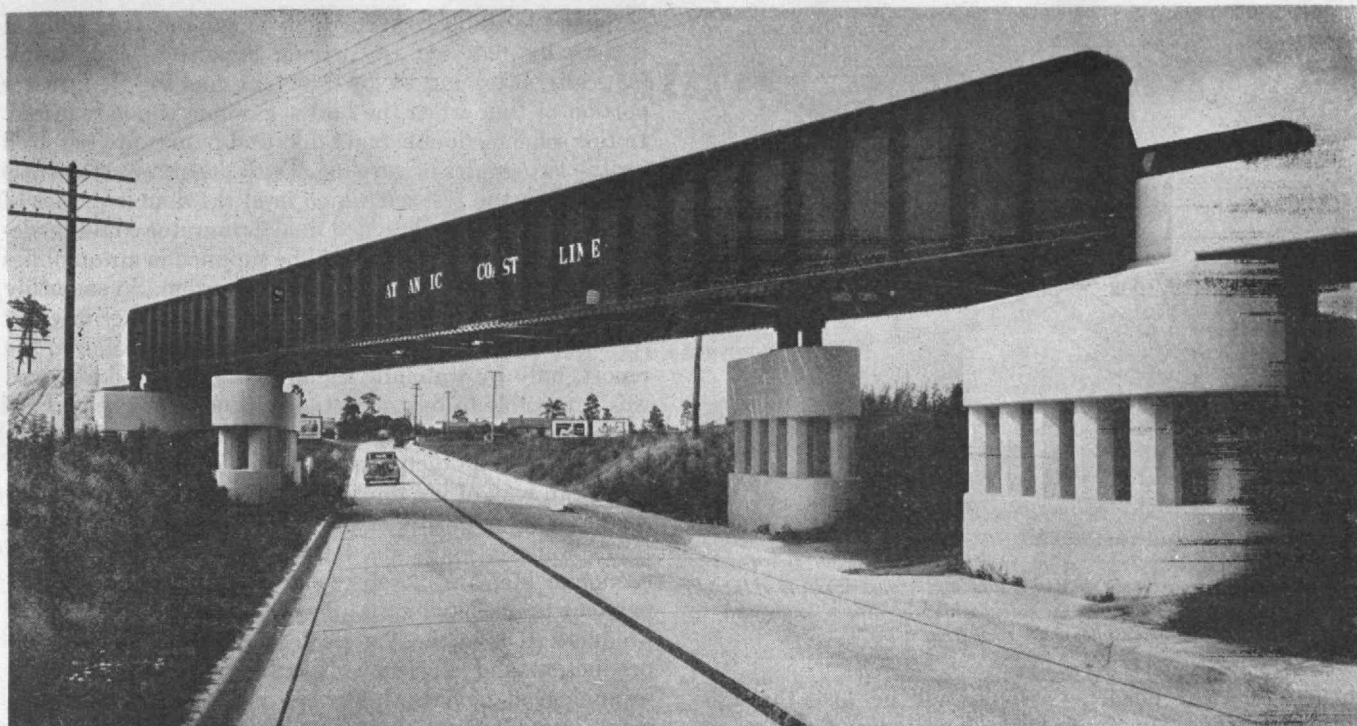


Photo by F. S. Lincoln, '22

Utilitarian design characterizes the railroad viaduct of the Atlantic Coast Line at Winter Park, Fla. Few structures typify the present technological era and our desire to travel better than such assemblies of steel and concrete.

Brathey Bridge, in the Lake Windermere district of England, reflects not only the calm and tranquil serenity of the English countryside in summer but the stoutness of its builders as well.

after "will descend toward zero." He says it is probable that domestic production will fail to meet needs within five or ten years from now.

One indication of the impending scarcity of oil reserves is the trend toward offshore drilling, since the continental shelves are about the only large areas fringing the United States which have not yet been extensively probed for oil. Already, two wells have been completed in the Gulf of Mexico, one five miles and the other 30 miles off the shore of Louisiana. Of these, one was driven to a depth of 12,874 feet but turned out to be a dry hole. Borings at the other struck the crest of a salt dome and subsequent drilling at the same site has so far failed to produce oil in commercial quantities. Questions of ownership of offshore oil fields complicate operations which might expedite deliveries from new sources of supply.

Even though the long-term possibilities of domestic supply are not optimistic, there are as yet no grounds to call the situation critical. Oil reserves in other parts of the world, notably the Middle East, are enormous, and are available so long as political conditions permit and sea transportation is feasible. Geologists suggest that, of the oil-producing regions so far known, the two largest are the basins surrounding the Gulf of Mexico and the Caribbean in one case, and the Persian Gulf in the other. Both have similar and highly promising structures; thick layers of marine sediments interposed with heavy layers of porous sandstone and limestone. In addition to such naturally occurring deposits, the practicability of produc-



Photo by Chester H. Pope, '09

ing liquid fuels from coal and oil shales has been demonstrated, although oil obtained in this way costs more than that obtained from naturally occurring deposits. In the background is the promise that, at least in certain fields, the pressure on petroleum may be relieved by progress in the industrial utilization of atomic energy. In spite of these technical possibilities, however, it would appear that the incentives to economize in our use of petroleum products are slated to increase in intensity as time goes on.

Since the automobile is the largest single consumer of liquid fuels in the United States, it is particularly significant to recall two recent steps which have been taken in this country to increase the efficiency of gasoline engines. Last summer Charles F. Kettering described the performance of gasoline engines with compression ratios as great as 12.5. A six-cylinder engine with this compression ratio was installed in a conventional automobile, replacing a 1946 engine with a compression ratio of six and four-tenths. The high compression engine weighed no more than a stock motor, but it had to be built to standards established for Diesel engines in order that its

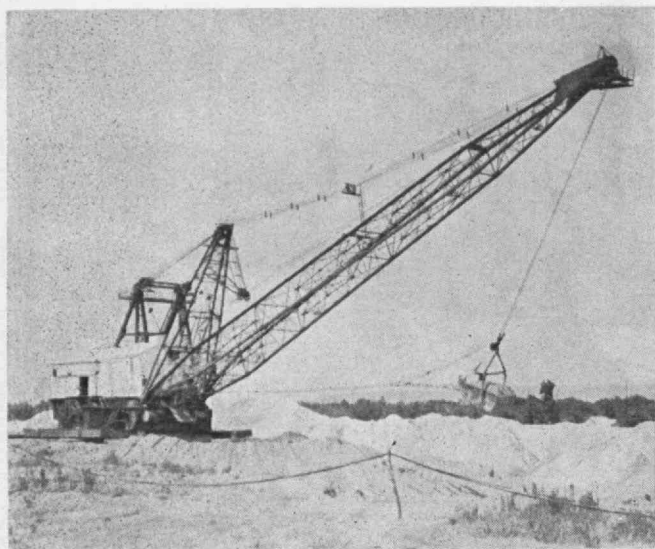


Photo by M. B. Crum, '25

Apparently precariously slanted is this long-armed dragline of the largest excavating shovel in the world while the dipper loads and unloads phosphate rock from a pit.

higher thermal efficiency would not be lost through higher friction. Maximum brake horsepower for the new engine was 95 as compared to 85 horsepower of the conventional engine which it replaced. The high compression engine reduced fuel consumption by approximately one-third, since 26.5 miles per gallon were obtained instead of the 18.5 miles per gallon for the car with the conventional stock motor. Because of the higher quality of fuel required, it is not likely that engines with compression ratios as high as 12 will be built immediately in large numbers. Nevertheless, it is interesting to observe that, so far as efficiency is concerned, the new engine represents about the same degree of progress over conventional engines as has already been accomplished in automotive engineering. In the last 30 years, compression ratios have increased from about four or four and a half, to about six and a half. With roughly a 50 per cent increase in compression ratio has come a saving in fuel consumption per brake horsepower of about 30 per cent. Concurrently have come improvements that have raised octane ratings from about 50 at the time of World War I * to about 70 or 80 for today's automotive fuels. To keep all these splendid advances in their proper perspective, however, it must be pointed out that during the same period, automobile registrations have increased from 6,150,000 in 1919 to more than 31,000,000 in 1945, with the United States making up about two-thirds of the world's motor vehicle registrations. During the same period, the horsepower rating of individual cars has increased two and a half to three times. The net result, of course, is a tremendous increase in the consumption of petroleum products for motor vehicles in the United States.

According to Socony-Vacuum laboratories, a car makes its maximum demand on the quality of fuel when accelerating or climbing hills, with the throttle wide open. Such operating conditions occur only about 10 per cent of the driving time. This observation provides a clue to another development which attempts to circumvent the expense and difficulty of fuel supply for high compression engines. Considerable economy in the use of premium

* This figure is obviously a guess for no octane scale existed 30 years ago.

gasoline is possible by using high octane fuel only when it is actually required by driving conditions, and automatically switching to lower octane fuel for the greater portion of time when the better gasoline is not required. In this scheme, double fuel tanks and pumps are required for the two grades of gasoline. Two carburetors were also provided in the test car which used the double grades of fuel but a specially designed dual carburetor could be designed and undoubtedly would be supplied in automobiles produced for use with the dual fuel system. So smoothly was the engine shifted from one fuel to another in early tests as driving conditions changed, that according to the report, only by watching signal lights on the dashboard was it possible to tell when the shift occurred.

Americans are no respecters of the *lebensraum* philosophy of European dictators, and certainly it is not in the American way of life to obtain material benefits selfishly at the expense of others. But it is evident that the nation's welfare, and indeed its entire technological and economic life, are closely connected with, and are dependent upon, having an adequate supply of petroleum products. It is in the American tradition to increase the production and efficiency of industrial operations and technological devices, however, and the two improvements recorded here represent the kind of progress in which we take pride.

Research in the West

ASIDE from independent studies by college professors, a little research worthy of the name appears to have been done prior to about 1900. Industrial research made substantial progress shortly after World War I but for some years was regarded more as a luxury than as a necessity. At least such was the impression created during the depression of the 1930's when many a research worker was dismissed from employment instead of being urged to bend his talents to the creation of new knowledge which, in turn, would result in new products for sale. But World War II appears to have put research not only on a firm footing but to have projected it into the class of big business as well. Now, research is here to stay.

As might be expected, research institutions, such as Arthur D. Little, Inc. and the Battelle Memorial Institute, for example, are well entrenched in the northeast quarter of the United States, which represents the oldest part of the country, and are hosts to major industrial and manufacturing projects. But the East has no monopoly on research. Armour Research Foundation in Chicago, the Midwest Research Institute in Kansas City extend facilities for scientific investigation into the Middle West, and the South is served by the Southern Research Institute at Birmingham. But the West is no longer a frontier outpost where land may be had for the settling, and it, too, is finding the need for its own comparable organizations, and getting them. Latest research organization to come to our attention is the Stanford Research Institute at Stanford University, Calif.

Under the guidance of Dr. Carsten Steffens, (who was National Research Fellow at M.I.T. in 1934-1935) as Director of Laboratories, and William E. Rand, '33, Assistant Director, the Stanford Research Institute is the first industrial research institute in the West. It offers research in engineering, chemistry, biology, physics and mathematics, and industrial and social sciences.

Physics in the Contemporary World

Advancement of Science, with Knowledge Imparted for Man's Benefit, is Held to be Responsibility of Scientists in Second Arthur D. Little Lecture

BY J. ROBERT OPPENHEIMER

IF I have, even in the title of this address, sought to restrict its theme, that does not imply an overestimate of physics among the sciences, nor a too great myopia for these contemporary days. It is rather that I must take my starting point in the science in which I have lived and worked, and a time through which my colleagues and I are living.

Nevertheless, I shall be discussing a number of things which are quite general for the relations between science and civilization. For it would seem that in the ways of science, its practice, the peculiarities of its discipline and universality, there are patterns which in the past have somewhat altered, and in the future may greatly alter, all that we think about the world and how we manage to live in it. What I shall be able to say of this will not be rich in exhortation; for this is ground that I know how to tread only very lightly.

But that I should be speaking of such general and such difficult questions at all reflects in the first instance a good deal of self-consciousness on the part of physicists. This self-consciousness is in part a result of the highly critical traditions which have grown up in physics in the last half century, where we have been forced to become aware of what it is that we are doing. It reflects also the experiences of this century, which have shown in so poignant a way how much the applications of science determine our welfare and that of our fellows, and which have cast in doubt that traditional optimism, that confidence in progress, which have characterized Western culture since the Renaissance.

It is then about physics rather than of physics that I shall be speaking, and there is a great deal of difference. You know that when a student of physics makes his first acquaintance with the theory of atomic structure and of quanta, he must come to understand the rather deep and subtle notion which has turned out to be the clue to unraveling that whole domain of physical experience. This is the notion of complementarity, which recognizes that various ways of talking about physical experience may each have validity, and may each be necessary for the adequate description of the physical world, and may yet stand in a mutually exclusive relationship to each other, so that to a situation to which one applies, there may be no consistent possibility of applying the other. Teachers very often try to find illustrations, familiar from experience, for relationships of this kind; and one of the most apt is the exclusive relationship between the practicing of an art and the description of that practice. Both are a part of civilized life. But an analysis of what we do and the doing of it — these are hard to bed in the same bed.

As it did on everything else, the last war had a great

and at least a temporarily disastrous effect on the prosecution of pure science. The demands of military technology in this country and in Britain, the equally overriding demands of the Resistance in much of Europe, distracted the physicists from their normal occupations, as they distracted most other men.

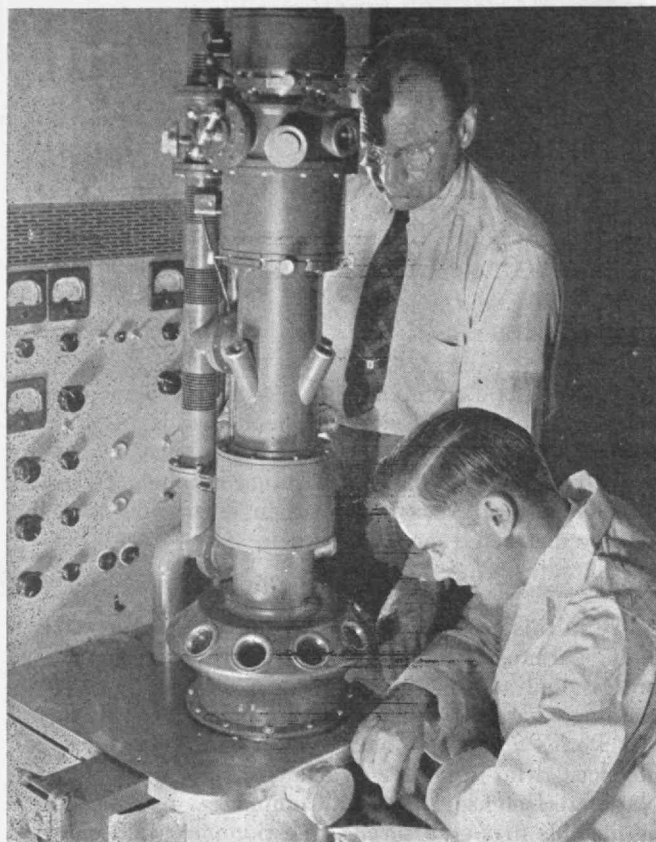
The Legacy of the War

We in this country, who take our wars rather spastically, perhaps witnessed a more total cessation of true professional activity in the field of physics, even in its training, than any other people. For in all the doings of war we, as a country, have been a little like the young physicist who went to Washington to work for the National Defense Research Committee in 1940. There he met his first civil service questionnaire, and came to the questions on drinking: "never, occasionally, habitually, to excess." He checked both "occasionally" and "to excess." So, in the past, we have taken war.

All over the world, whether because of the closing of universities, or the distractions of scientists called in one way or another to serve their countries, or because of devastation and terror and attrition, there was a great gap in physical science. It has been an exciting and an inspiring sight to watch the recovery: a recovery testifying to extraordinary vitality and vigor in this human activity. Today, barely two years after the end of hostilities, physics is booming.

One may have gained the impression that this boom derives primarily from the application of the new techniques developed during the war, such as the atomic reactor and microwave equipment; one may have gained the impression that in large part the flourishing of physics lies in exploitation of the eagerness of governments to promote it. These are indeed important factors. But they are only a small part of the story. Without in any way deprecating the great value of wartime technology, one nevertheless sees how much of what is today new knowledge can trace its origin directly, by an orderly yet imaginative extension, to the kind of things that physicists were doing in their laboratories and with their pencils almost a decade ago.

Let me try to give a little more substance to the physics that is booming. We are continuing the attempt to discover, to identify and characterize, and surely ultimately to order, our knowledge of what the elementary particles of physics really are. I need hardly say that in the course of this we are learning again how far our notion of elementarity, of what makes a particle elementary, is from the early atomic ideas of the Hindu and Greek atomists, or even from the chemical atomists of a century ago. We are finding out that what we are forced



to call elementary particles retain neither permanence nor identity, and they are elementary only in the sense that their properties cannot be understood by breaking them down into subcomponents. Almost every month has surprises for us in the findings about these particles. We are meeting new ones for which we are not prepared. We are learning how poorly we had identified the properties even of our old friends among them. We are seeing what a challenging job the ordering of this experience is likely to be, and what a strange world we must enter to find that order.

In penetrating into this world perhaps our sharpest tool in the past has been the observation of the phenomena of the cosmic rays in interaction with matter. But the next years will see an important methodological improvement, when the great program of ultrahigh energy accelerators begins to get under way. This program is itself one of the expensive parts of physics. It has been greatly subsidized by the government, primarily through the Atomic Energy Commission and the Office of Naval Research. It is a superlative example, of which one could find so many, of the repayment that technology makes to basic science, in providing means whereby our physical experience can be extended and enriched.

Another progress is the refinement of our knowledge of the behavior of electrons within atomic systems, a refinement which on the one hand is based on the microwave techniques, to the developments of which the Radiation Laboratory of M.I.T. made unique contributions, and which on the other hand has provided a newly vigorous criterion for the adequacy of our knowledge of the interactions of radiation and matter. Thus we are beginning to see in this field at least a partial resolution, and I am myself inclined to think rather more than that, of the paradoxes that have plagued the professional physical theorists for two decades.

A third advance in atomic physics is in the increasing understanding of those forces which give to atomic nuclei their great stability, and to their transmutations their great violence. It is the prevailing view that a true understanding of these forces may well not be separable from the ordering of our experience with regard to elementary particles, and that it may also turn on an extension to new fields of recent advances in electrodynamics.

Recovery of Physics

However this may be, all of us who are physicists by profession know that we are embarked on another great adventure of exploration and understanding, and count ourselves happy for that. In how far is this an account of physics in the United States only? In how far does it apply to other parts of the world, more seriously ravaged and more deeply disturbed by World War II? That question may have a somewhat complex answer, to the varied elements of which one may pay respectful attention.

In much of Europe and in Japan, that part of physics which does not rest on the availability of elaborate and radical new equipment is enjoying a recovery comparable to our own. The traditional close associations of workers in various countries make it just as difficult now to disentangle the contributions by nationality as it was in the past. But there can be little doubt that it is very much harder for a physicist in France, for instance, or the Low Countries, and very much more nearly impossible for him in Japan, to build a giant accelerator, than for the workers in this country.

Yet in those areas of the world where science has not merely been disturbed or arrested by war and by terror, but where terror and its official philosophy have, in a deep sense, corrupted its very foundations, even the traditional fraternity of scientists has not proved adequate protection against decay. It may not be clear to us in what way and to what extent the spirit of scientific inquiry may come to apply to matters not yet and perhaps never to be part of the domain of science; but that it does apply there is one very brutal indication. Tyranny, when it gets to be absolute, or when it tends so to become, finds it impossible to continue to live with science.

Even in the good ways of contemporary physics, we are reluctantly made aware of our dependence on things which lie outside our science. The experience of the war, for those who were called upon to serve the survival of their civilization through the Resistance, and for those who contributed more remotely, if far more decisively, by the development of new instruments and weapons of war, has left us with a legacy of concern. In these troubled times it is not likely that we shall be free of it altogether. Nor perhaps is it right that we should be.

Nowhere is this troubled sense of responsibility more acute, and surely nowhere has it been more prolix, than among those who participated in the development of atomic energy for military purposes. I should think that most historians would agree that other technical developments, notably radar, played a more decisive part in determining the outcome of this last war. But I doubt whether that participation would have of itself created the deep trouble and moral concern which so many of us who were physicists have felt, have voiced, and have

tried to get over feeling. It is not hard to understand why this should be so. The physics which played the decisive part in the development of the atomic bomb came straight out of our laboratories and our journals.

Despite the vision and the farseeing wisdom of our wartime heads of state, the physicists felt a peculiarly intimate responsibility for suggesting, for supporting, and in the end, in large measure, for achieving, the realization of atomic weapons. Nor can we forget that these weapons, as they were in fact used, dramatized so mercilessly the inhumanity and evil of modern war. In some sort of crude sense which no vulgarity, no humor, no overstatement can quite extinguish, the physicists have known sin; and this is a knowledge which they cannot lose.

Probably in giving expression to such feelings of concern most of us have belabored the influence of science on society through the medium of technology. This is natural, since the developments of the war years were almost exclusively technological, and since the participation of academic scientists forced them to be deeply aware of an activity of whose existence they had always known but which had been often remote from them.

When I was a student at Göttingen 20 years ago, there was a story current about the great mathematician Hilbert, who perhaps would have liked, had the world let him, to have thought of his science as something independent of worldly vicissitudes. Hilbert had a colleague, an equally eminent mathematician, Felix Klein, who was certainly aware, if not of the dependence of science generally on society, at least of the dependence of mathematics on the physical sciences which nourish it and give it application. Klein used to take some of his students to meet once a year with the engineers of the Technische Hochschule in Hannover. One year he was ill, and asked Hilbert to go in his stead, and urged him, in the little talk that he would give, to try to refute the then prevalent notion that there was a basic hostility between science and technology. Hilbert promised to do so; but when the time came a magnificent absent-mindedness led him instead to speak his own mind: "One hears

a good deal nowadays of the hostility between science and technology. I don't think that is true, gentlemen. I am quite sure that it isn't true, gentlemen. It almost certainly isn't true. It really can't be true. They have nothing whatever to do with one another." Today the wars and the troubled times deny us the luxury of such absent-mindedness.

Responsibility of Scientists

The great testimony of history shows how often in fact the development of science has emerged in response to technological, and even economic needs, and how in the economy of social effort, science, even of the most abstract and recondite kind, pays for itself again and again in providing the basis for radically new technological developments. In fact, most people, when they think of science as a good thing, when they think of it as worthy of encouragement, when they are willing to see their governments spend substance upon it, when they greatly do honor to men who in science have attained some eminence, have in mind that the conditions of their life have been altered by just such technology, of which they may be reluctant to be deprived.

The debt of science to technology is just as great. Even the most abstract researches owe their very existence to things that have taken place quite outside of science, and with the primary purpose of altering and improving the conditions of man's life. As long as there is a healthy physics, this mutual fructification will surely continue. Out of its work there will come in the future, as so often in the past, and with an apparently chaotic unpredictability, things which will improve man's health, ease his labor, and divert and edify him. There will come things which, properly handled, will shorten his working day and take away the most burdensome part of his effort, which will enable him to communicate, to travel, and to have a wider choice both in the general question of how he is to spend his life, and in the specific question of how he is to spend an hour of his leisure. There is no need to belabor this point, nor its obverse — that out of science there will come, as there

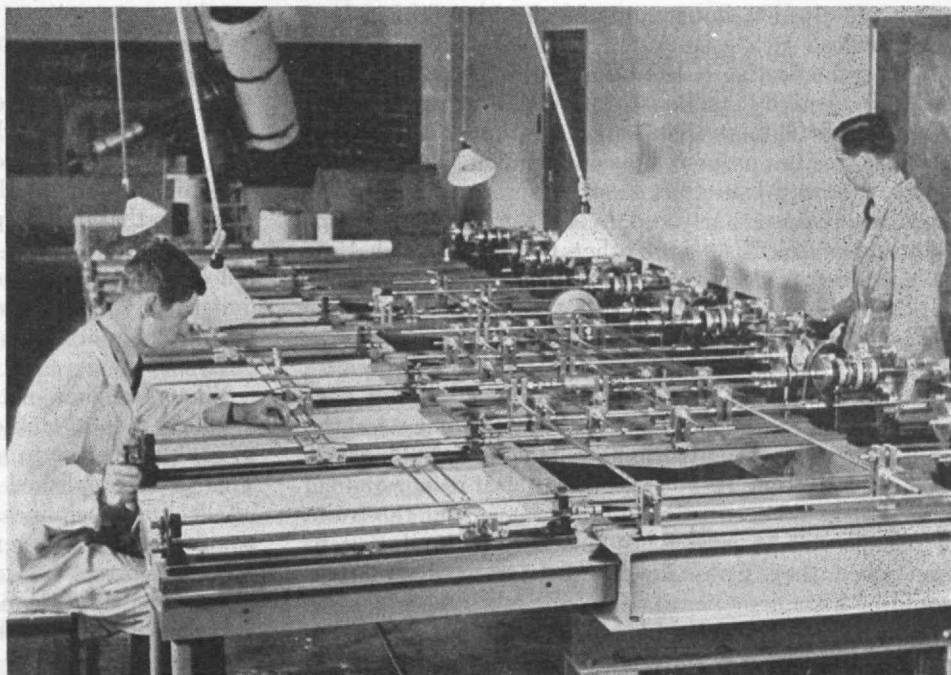


Photo by Dahlberg from *Three Lions*

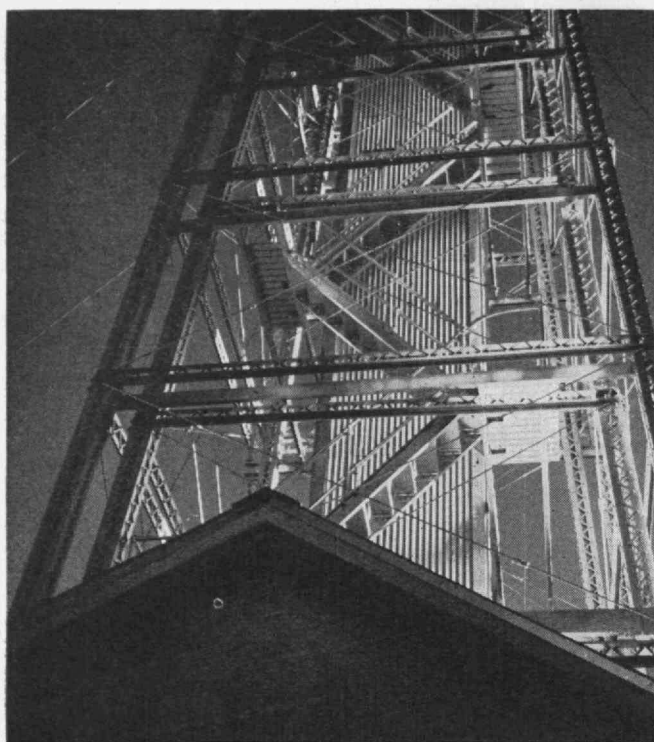


Photo by Clarke from Black Star

has in this last war, a host of instruments of destruction which will facilitate that labor, even as they have facilitated all others.

But no scientist, no matter how aware he may be of these fruits of his science, cultivates his work, or refrains from it, because of arguments such as these. No scientist can hope to evaluate what his studies, his researches, his experiments may in the end produce for his fellow men, except in one respect: if they are sound, they will produce knowledge. And this deep complementarity between what may be conceived to be the social justification of science, and what is for the individual his compelling motive in its pursuit, makes us look for other answers to the question of the relation of science to society.

One of these is that the scientist should assume responsibility for the fruits of his work. I would not argue against this, but it must be clear to all of us how very modest such assumption of responsibility can be, how very ineffective it has been in the past, how necessarily ineffective it will surely be in the future. In fact, it appears little more than an exhortation to the man of learning to be properly uncomfortable; and, in the worst instances, is used as a sort of screen to justify the most casual, unscholarly and, in the last analysis, corrupt intrusion of scientists into other realms of which they have neither experience nor knowledge, nor the patience to obtain it.

The true responsibility of a scientist, as we all know, is to the integrity and vigor of his science. And because most scientists, like all men of learning, tend in part also to be teachers, they have a responsibility for the communication of the truths they have found. This is at least a collective if not an individual responsibility. That we should see in this any insurance that the fruits of science will be used for man's benefit, or denied to man when they make for his distress or destruction, would be a tragic naïveté.

There is another side of the coin. This is the question of whether there are elements in the way of life of the

scientist which need not be restricted to the professional, and which have hope in them for bringing dignity and courage and serenity to other men. Science is not all of the life of reason; it is a part of it. As such, what can it mean to man?

Perhaps it would be well to emphasize that I am talking neither of wisdom, nor of an elite of scientists, but precisely of the kind of work and thought, of action and discipline, that makes up the everyday professional life of the scientist. It is not of any general insight into human affairs that I am talking. It is not the kind of thing we recognize in our greatest statesmen, after long service devoted to practical affairs and to the public interest. It is something very much more homely and robust than that. It has in it the kind of beauty that is inseparable from craftsmanship and form, but that has in it also the vigor which we rightly associate with the simple ordered lives of artisans or of farmers, that we rightly associate with lives to which limitations of scope, and traditional ways, have given robustness and structure.

The Discipline of Science

Even less would it be right to interpret the question of what there is in the ways of science which may be of general value to mankind in terms of the creation of an elite. The study of physics, and I think my colleagues in the other sciences will let me speak for them too, does not make philosopher-kings. It has not, until now, made kings. It almost never makes fit philosophers — or so rarely that they must be counted as exceptions. If the professional pursuit of science makes good scientists, if it makes men with a certain serenity in their lives, who yield perhaps a little more slowly than others to the natural corruptions of their time, it is doing a great deal, and all that we may rightly ask of it. For if Plato believed that in the study of geometry, a man might prepare himself for wisdom and responsibility in the world of men, it was precisely because he thought so hopefully that the understanding of men could be patterned after the understanding of geometry. If we believe that today, it is in a much more recondite sense, and a much more cautious one.

When then is the point? For one thing it is to describe some of the features of the professional life of the scientist, which make of it one of the great phenomena of the contemporary world. Here again, I would like to speak of physics; but I have enough friends in the other sciences to know how close their experience is to ours. And I know too that despite profound differences in method and technique, differences which surely are an appropriate reflection of the difference in the areas of the world under study, what I would say of physics will seem familiar to workers in other disparate fields, such as mathematics, or biology.

What are some of these points? There is, in the first instance, a total lack of authoritarianism, which is hard to comprehend or to admit unless one has lived with it. This is accomplished by one of the most exacting of intellectual disciplines. In physics the worker learns the possibility of error very early. He learns that there are ways to correct his mistakes; he learns the futility of trying to conceal them. For it is not a field in which error awaits death and subsequent generations for verdict: the next issue of the journals (*Continued on page 231*)

Relation of Conservation to Engineering Projects

Conservation Urged as Part of the Everyday Working Philosophy of Engineers

BY IRA N. GABRIELSON

EVERY engineering and development project affects land or water and wild life. That effect may be local and insignificant or it may be widespread and of major importance depending upon the character and the extent of the engineering development. For example, the construction of a highway has the immediate effect of taking out of vegetative production the actual strip on which the pavements are laid and thus to this extent it reduces the environment and food supply for wild life. That particular strip of land is also taken out of any potential agricultural or forest production. The construction of an airfield, the building of a city or a town and many other construction activities have similar direct results. In addition to the obvious direct effects, these projects may have surprising indirect effects upon the distribution and abundance of wild life, but they affect natural resources only locally and, from the point of view of the conservationist, are relatively insignificant. There are other engineering projects that have major effects upon the natural resources of large areas. The most important of such projects are drainage, impoundment of water, flood control, and the building of industrial plant and community sewage disposal facilities that empty their waste into streams and lakes. At times, such constructions have been very destructive of natural resources — often needlessly so. It is not those that have justified themselves but rather those of questionable long-time value, and those that have been proven to be mistakes, that we may use as object lessons. In an effort to avoid similar mistakes in the future, it might be well to discuss the effects on major conservation values of each type of project.

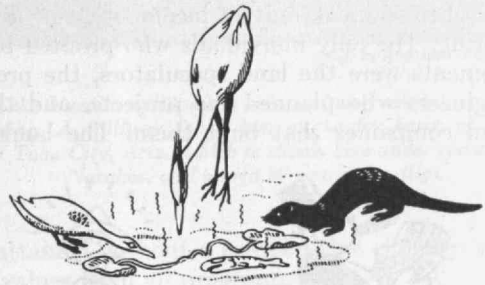
Drainage

Whether by ditching or by diversion of water, drainage of land has had a major effect upon the lands of North America. Approximately 100,000,000 acres of land have been drained by one method or another in the last 75 years. Such a radical alteration in the character of a large area cannot fail to have had profound consequences on the economy and upon the wild life and fish values of the communities affected. Some drainage projects have justified themselves in providing exceedingly rich agricultural lands yielding a greater value than could have been produced had the areas remained marshlands. A much larger percentage of drainage schemes are of questionable value. Some projects, resulting in the destruction of natural values, failed to yield the benefits anticipated from the drainage program.



Of the areas that could produce good agricultural land at a reasonable cost by drainage, most have already been drained. In the future, mistakes will be more easily made and will be much more costly than in the past. It is exceedingly important, therefore, to heed the lessons which previous mistakes teach.

A major result from the drainage already carried out and adverse to wild life has been the destruction of much breeding, feeding, and wintering grounds for the migratory waterfowl. Drainage has also destroyed much



breeding territory for aquatic and semiaquatic fur-bearing mammals and has, of course, completely eliminated the fish production in the drained areas. The lowering of water tables, sometimes a further adverse result of improper drainage, has made it more difficult to get local supplies of drinking water. The lowered water tables have reduced the productivity of the higher lands, particularly during the drought periods, and even in years of good rainfall have made it impossible to raise soil water levels sufficiently to produce maximum crops.

Millions of dollars of public funds have been spent in efforts to correct the errors and undo the destruction occasioned by many drainage projects. The mistakes most commonly made in drainage projects include failure to give proper consideration to fertility of soil of drained regions, careless or inadequate engineering, filling of marshlands for industrial sites, and indiscriminate drainage for mosquito control.

Marshes and lakes in which the underlying soil was of such a character as to be totally unproductive have often been drained. In at least some cases soil physicists and chemists informed the project developers in writing that the soils at the bottoms of these lakes and marshes were of a character as to be totally unproductive for agricultural purposes. Yet the drainage program went on. Such errors can be attributed to greed or selfishness rather than to ignorance.

There have also been cases of careless engineering in which very expensive drainage construction was completed before it was known that the gradient was too small to drain the land off rapidly enough to put in crops. For example, one drainage project in northern Minnesota was designed to provide 60,000 acres of farm land. A very extensive and expensive system of ditches through this marsh produced a total of 1,200 acres that could be cultivated even during the driest years. The remainder of the land was totally unproductive. After more than 30 years, the Fish and Wildlife Service purchased and re-flooded the land. It is now producing a fine waterfowl breeding and feeding ground and is of growing value in the production of muskrats and fish. Another area of 22,000 acres in south-central Missouri was drained at great expense but only a small fraction of it was ever capable of producing crops. When the ditches were completed, it was found that the gradient was so low that the catch basin could not be emptied of ordinary rainfall fast enough to allow a crop in four seasons out of five. Considerable time will elapse before these two areas recover their primitive productiveness because of the necessity of restoring food and environmental conditions before maximum utilization and production of wild life can be expected. Yet this land, or rather water, is already producing substantial returns through conservation methods.

Such schemes speak only of incompetent or dishonest engineering. The only individuals who profited by these developments were the land speculators, the promoters and engineers who planned the projects, and the construction companies that built them. The landowners,



the community, and the nation lost by the destruction of an exceedingly productive area without the substitution of any value in its place. The Missouri area formerly provided a livelihood for many people by its fish, fur, and waterfowl production. At one time the swampy lake in the Missouri area was one of the most productive small freshwater fisheries of the country. The thousands of pounds of fish annually marketed assured a livelihood for a number of families. The yield of waterfowl and fur provided for still other families, all without public expense and without any attempt to improve production. This area is now being purchased for restoration and will eventually be returned to a productive state, but nothing can bring back the years of lost productivity.

Drainage and destruction of marsh and water areas have been carried out for other than agricultural purposes. For example, many acres of once productive marshes around San Francisco Bay have been filled in to obtain industrial sites.

The indiscriminate drainage for mosquito control purposes has been another source of the destruction of marshes, particularly of salt marshes. Some of these

projects have been well engineered and effective, others have been neither. On the Atlantic Coast thousands of acres of marshes, ditched for mosquito control, are producing more mosquitoes than they did in their original state; in addition, their productive value has been greatly reduced or entirely destroyed.

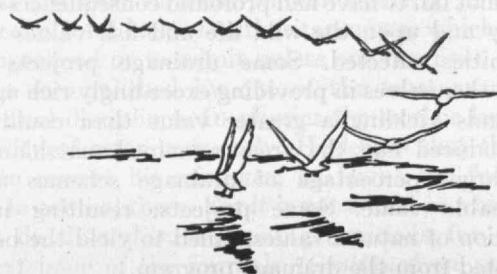
Far from being wastelands, salt marshes are exceedingly important in producing fish and waterfowl food. They are the natural breeding place of much small animal life upon which waterfowl and the young of many important commercial fishes feed. By drying up salt marshes the environment of surrounding waters has often been altered to such extent as to destroy spawning grounds or reduce greatly the natural productive sources of food. Important waterfowl food beds in South Carolina and other coastal states have been completely destroyed without any compensating gain.

The destruction of much marshland was entirely needless. Repeatedly, it has been demonstrated that good results in mosquito control, without the destruction of other values, are obtainable through careful planning of drainage projects supported by some knowledge of ecological and biological factors. It is more and more important, therefore, that engineers have some knowledge of the over-all effects that may result from different types of engineering projects.

What is the Remedy?

The chief trouble has been in the basic philosophy of the businessmen and engineers who promoted drainage projects often in the mistaken belief that they were doing something beneficial for the community. It is a common idea that marshland is wasteland. Until men recover from this delusion, there is little hope that drainage projects will be proposed and constructed on a sound basis. Marshlands are not unproductive. Marshes are sometimes the spawning grounds for the best species of fish, and they are vitally important as wintering grounds for a large part of North America's waterfowl. Fresh-water marshes on the eastern shore of Maryland regularly produce greater net cash return per acre than the finest adjoining farm land. Each of hundreds of thousands of acres of coastal marsh along the Gulf Coast produce from 40 to 70 muskrats per year. When marshlands are properly managed and harvested, such returns can continue indefinitely. The management cost per acre is low; the principal expense being the actual trapping of the animals and the handling and marketing of the pelts.

Planning for future drainage of marshlands should take into consideration their present or potential productive capacity; the character of the soil and its value for agricultural use; the proportion of seasons in which it can reasonably be expected to produce agricultural crops



after the drainage program is complete; and the essential value of these lands in maintaining the North American waterfowl population which furnishes a major source of outdoor recreation and sport. Sometimes, because of its location, a marsh is valuable all out of proportion to the actual food produced, since it furnishes the only food and suitable resting place for the migratory flights for many, many miles along the flyway. This multiplies its actual value to many times the value of the food actually produced. If these permanent public values are realized and balanced against the potential productive value of the lands when drained, there will be far fewer drainage projects promoted and consummated in the future than there have been in the past.

Impoundments

At the present time major impoundments are usually built for one of three purposes: irrigation, hydroelectric power development, or flood control. In some cases two or more of these purposes are combined, yet impoundments for flood control differ so much from those for hydroelectric power that a reservoir can seldom be used for both purposes without sacrificing much of the value for one purpose or the other. An impoundment for irrigation cannot be used (except incidentally) for flood control or hydroelectric power if it is to perform completely its major function.

Irrigation developments may benefit or harm wild life. Irrigation impoundments have destroyed many valuable mountain lakes and streams without substituting equivalent wild-life habitat. Because of the nature and the season of the drawdown of reclamation projects it is exceedingly difficult to maintain wild life in or adjacent to impounded waters. Following impoundment there is usually a period of high productivity of fish, but as oxidation takes place and the early food production slumps, fishing goes with it. Reservoirs that fluctuate wildly, particularly during the spawning period and the growing season for aquatic plants, cannot be expected to be very productive of fish, of waterfowl food, or of foods for muskrats and other fur bearers.

Benefits to wild-life species can be increased greatly by incorporating appropriate conservation measures at the time the project is planned. A case in which a co-ordinated conservation and engineering program has been worked on from the beginning is the irrigation planned by use of water from the Grand Coulee Dam reservoir. When water is put on this land, it is certain to provide some benefits to waterfowl, and small upland game and fur bearers, a result which could not have



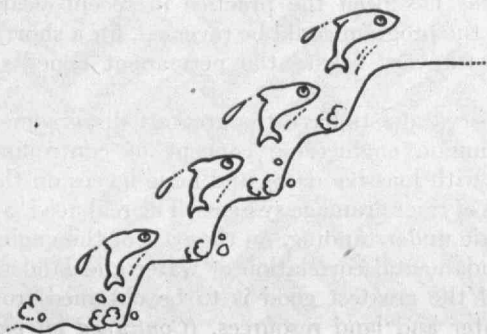
Photo by American Wildlife Institute

Land of the Navaho Indians has been seriously eroded as a result of overgrazing. A spillway for a dam at the dry basin of Red Lake, north of Tuba City, Ariz., which is shown here under construction by Navahos, will benefit 30 nearby families.

been attained without a co-operative effort to get maximum values from all programs.

The building of this dam cut the upper Columbia run of Chinook and blueback salmon from their spawning grounds. Coincident with the construction of the dam, a program of fish transplanting was carried out. As a result these species were successfully transferred to other streams that emptied into the Columbia below Grand Coulee Dam and which have not previously been used by salmon because of obstructions in the streams. These obstructions were removed or fish ladders built around them. The cost of the construction, the facilities for handling the fish, and the actual transplanting job was charged as a part of the construction cost of the project. This is as it should be as fish and other wild life are a public resource that deserve every consideration.

This principle is now embodied in the Federal law. Henceforth, no Federal agency can impound water without giving both the Federal Wildlife agency and the conservation agencies of the state in which the proposed work is located an opportunity to sit in on the planning, to evaluate its good or bad effects upon the fish and wild life, and to find means to offset any damage that may be found. In the case of certain proposed reclamation impoundments that might destroy existing wild-life refuge areas, agreements have already been reached whereby all such areas will be replaced by areas of equal productive capacity provided as part of the cost of the construction agency. This is a big step forward both in co-operation work and in public understanding.

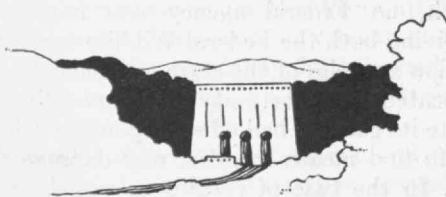


Hydroelectric power impoundments usually provide the least values for wild life and do the most harm to fish and wild life of the streams on which they are located. The reservoirs are filled at flood times and drawn down at the time of greatest power demand. Their widely and wildly fluctuating water levels make it difficult, if not impossible, to develop a biological program on the impoundment. There are exceptions to this statement, but they usually trace back to accidents of climate and location. Good biological conditions can be and have been created in hydroelectric developments in which the upper ones of a series of dams are used only as reservoirs and downstream dams are used for maximum power production with water levels maintained relatively constant. As they have operated up to the present time, the Tennessee Valley Authority series of impoundments are a good example of this. Fishing has held up exceedingly well in the headwater reservoirs partly because the drawdown does not normally occur until after fish-spawning periods, but also because water levels are fairly constant well into the summer on the lower reservoirs. Generally, however, hydroelectric power impoundments are difficult to manage so as to protect or increase fish and wild-life populations because of the large water-level fluctuations and the rapidity of such changes.

Good fish-spawning areas and fine stands of waterfowl foods have been developed where it has been possible to cut off a narrow channel and protect the enclosed water area from the extreme fluctuations. In a few other areas where impoundment was not feasible or desirable, certain areas have been diked off and pumped dry. Crops of desirable waterfowl foods have been grown, and in the fall water was allowed to come into the dewatered area from the main reservoir. This scheme has been used successfully in areas of high malarial hazard to provide wintering grounds for waterfowl, as well as to guard against malaria mosquitoes. The water is returned to the area after the mosquito season is passed and pumped out again before the malaria mosquito period of the next season. By spreading a shallow layer of water over the area the ducks have ready access to an additional food supply without interfering with the primary purpose of the main impoundment.

Flood Control

Present engineering practices on flood control have probably provoked more controversy than any other single item of water management. An increasing number of soil physicists, soil conservation technicians, biologists, and limnologists are insisting that proper flood control does not consist only of huge dams and levees far down



on the lower reaches of a stream. They believe that these levees and the structures are at best of temporary value and that the permanent and logical way to reduce flood crests and to control them is to work first by using natural mechanisms to the limit before attempting

to do the job by engineering devices. They believe that the first step toward proper control of flood waters is to install a system of proper land management that includes the control of water from the moment it falls to the ground. They believe that small ponds, proper terracing, contour plowing, strip cropping, and the similar devices of managing land to prevent destructive erosion, all practices that force water into the ground and insure the maximum possible amount of ground water storage, are the first elements in flood control. They believe that huge structures built on the main stems of the streams, without any accompanying effort to retard runoff from the land, are temporary and expensive ways of handling water.

To emphasize their point they call attention to the fact that such reservoirs silt up within a comparatively short time and become progressively more useless for flood control purposes. A great many of them silt up more rapidly than the calculations indicated at the time of their construction.

On the lower reaches of major streams such as the Mississippi, the levee system, built originally for the protection of cities and other important spots, has now been extended to cover many hundreds of miles of river bank. The levees are not only built bigger and higher as time goes on, but are crowded to the river as one area after another of the normal flood plane of the river is removed from that use by additional dikes. Consequently, the river is crowded into a narrower and narrower plane and channel. The inevitable result is that greater volumes of water and greater velocities must be dealt with so that flood crests frequently establish new records for high-water marks and property destruction. After all the hundreds of millions of dollars spent for flood control and navigation on two occasions in recent years the Ohio River has surpassed previous records for flood damage.

It is the growing belief of biologists and land managers that nearly all construction for flood control has been based on a mistaken premise. They contend that it is valuable for temporary use only, that the major effort and expenditure should be on the upstream control through the use of many small structures and by proper land and water management at the source of trouble. It is acknowledged that there will be fewer great dams built if such a program were to be followed, but there is growing understanding, and with it comes conviction, that the greatest good to the American people could come from the expenditures aimed at controlling flood waters, so far as possible, at the source. Instead of spending \$25,000,000 or \$30,000,000 for soil conservation and upstream water management, and \$100,000,000 to \$200,000,000 annually for massive dikes or dams on the main rivers, as has been the practice in recent years, they believe the program could be reversed, for a short time at least, with very substantial permanent benefits to the nation.

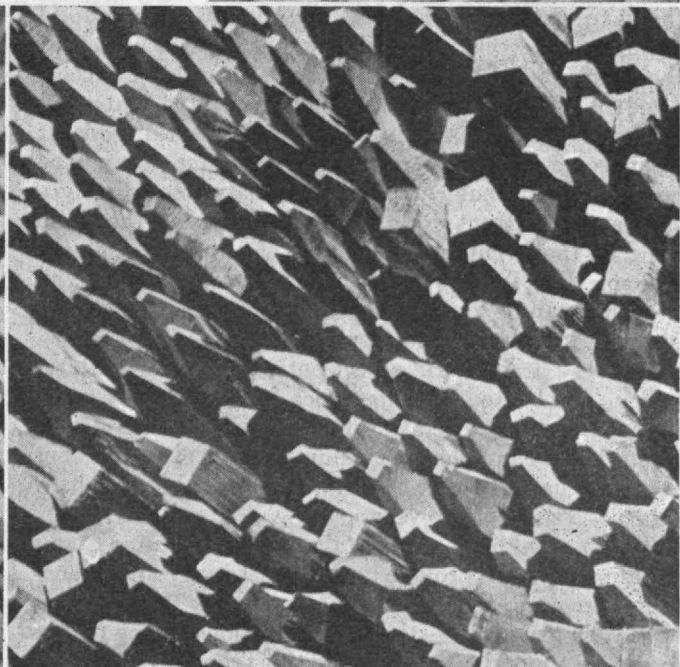
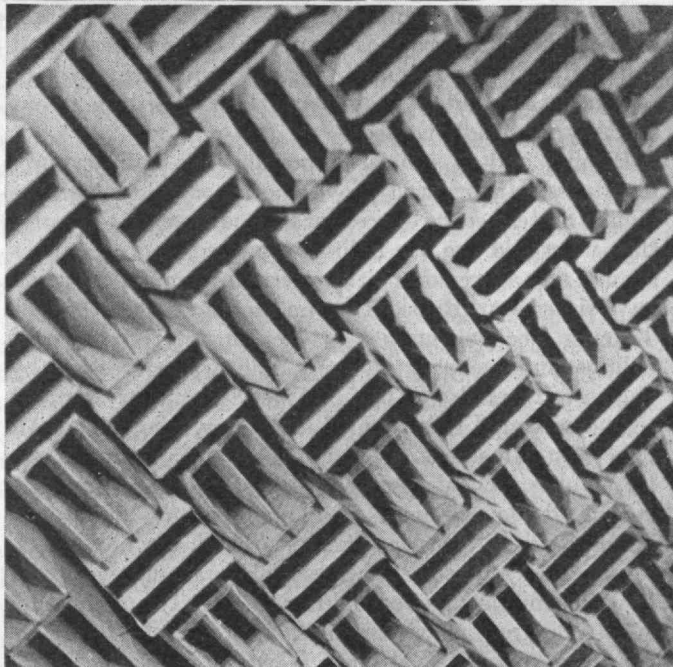
Conservationists have the greatest disagreement with the common engineering concept of controlling flood waters with massive dams and huge levees on the lower reaches of river drainage systems. The real need, however, is a basic understanding, on the part of the engineers, of the fundamental correlation of water and land management if the greatest good is to be obtained from both the water and land resources. (Continued on page 218)



Industrial Patterns

Examples of a few of the many interesting patterns of science, engineering, or industry are shown on this page. The views may be regarded as being slightly disguised since only portions of the originals are presented. Four of the five illustrations are of everyday subjects; the fifth is somewhat unusual.

Can you identify the subjects shown in the panels? Watch for next month's Review for answers.



Evitability of World War III

In Addition to the Technical Training which Students at M.I.T. Receive, Every Effort Is Also Made to Develop Their General Education

BY FREDERIC B. KRAFFT

THE danger of a third World War does not lie in the far future. We are faced with the definite probability of war within a decade, unless exceptional statesmanship, supported by enlightened public opinion, can guide us through these next few years. Barring the remote possibility of a bacteriological revenge attack by Germany or Japan, or some disgruntled small nation, in the foreseeable future the only countries with the resources to wage full-scale warfare are the United States and the Union of Soviet Socialist Republics. It is the area of conflict between these two, fundamentally ideological, which must be contained and finally eliminated if war is to be avoided.

In this area of conflict, there are almost irresistible forces pushing the two nations and their satellites into war. Briefly, these forces are: the ideological differences between democracy, as we, in the United States, understand it, and communism, the disintegration of the British Empire, creating a power vacuum in certain strategic areas of the world, Russian political and geographic expansionism, which conflicts with American ideals of self-determination of peoples and ultimately threatens our security, and finally, economic disorganization and mounting pressures within Russia, which would be most easily quelled by the threat of an outside enemy.

If continued, the present patchwork method of attempting to solve the dilemma presented by Soviet ideological and geographic expansion and the increasing power vacuum in many parts of the world will lead eventually to war. It has become a truism to say that world power means world responsibility, but it is a truism that the people of the United States have not yet fully recognized. We face a world crisis. Only the United States has the power to effect a plan for permanent world peace. It has become our urgent responsibility to understand the possibilities of conflict and to formulate immediately a clear and consistent world policy that will give the world hope of the eventual elimination of those possibilities. The so-called Truman Doctrine is not a world policy, although it can be a useful implement of such a policy. To insure peace, it must be integrated with other implements, within the framework of a continuing United States policy. The United Nations, which for the past two years we have wishfully tried to substitute for a foreign policy, is another such implement. An implement of tremendous potential usefulness, it is, for the present, immobilized by Russia's use of the veto.

To offer real hope of maintaining peace, United States world policy must provide both a short-range and a long-range program. The short-range plan has two weapons already in existence — the United Nations, which for the present is a moral force only, and the Truman Doctrine of

economic and military aid to countries threatened by communist pressures.

To be immediately successful, and to give us time to work out the long-range plan for permanent peace, we must forge three additional weapons. First, we must sell our democratic ideals in the strategic areas of the world as Russia's propagandists attempt to sell the ideals of communism. Western ideas of political and individual freedom, government by majority, and a high standard of living for all, can offer as much as communist twaddle about a "dictatorship of the proletariat" and can give vastly more to the backward and war-devastated countries. It is in the realm of ideas in many of these areas that our greatest danger lies. As yet unprepared to wage another war, Russia is furthering her expansionist aims through political weapons, communist uprisings, guerrilla tactics, and political coup d'état. It is to counter this Soviet political weapon that the Truman Doctrine was developed. It needs the support of a democratic sales campaign to offset the infiltration of communist ideas and to nullify the charge of "American imperialism."

Another instrument in our immediate campaign to prevent war must be co-operation with Great Britain and France in the reconstruction of Europe, since Russian intransigence blocks a Four Power settlement. We must also continue the closest possible collaboration, military and economic, with Great Britain. The British Empire is in the process of disintegration, but the British Commonwealth of Nations is still a potent influence in the world and provides vitally important bases and resources. Moreover, the Commonwealth is our next of kin, politically and culturally. The basic line of present Soviet strategy is to separate the United States and Great Britain. That strategy must not succeed.

Finally, and of utmost importance, is military preparedness. History will prove the theory that had the United States been prepared for war and warned the world that we would use our military and economic resources against any aggressor, neither Germany nor Japan would have risked war. Russia must be convinced that the new Truman Doctrine implies so deep an interest in world politics and welfare that any military aggression by Russia will be followed by full American military support to the victim. Unification of the Army, Navy, and Air Forces into an efficient Department of War, with particular emphasis on air power, universal military training, continued development and manufacture of atomic bombs, and all-out scientific research in the field of defensive and offensive weapons will persuade the Soviet that any military move would be suicide. To suggest that such a program of preparedness may provoke Russia to countermeasures is absurd. (Continued on page 226)

The Limitations of Technique

Presented Here Are Two Unedited Papers from First- and Second-Year Students, Submitted for the Robert A. Boit Prize to Stimulate Best Use of English

BY WILLIAM S. EDGERLY

TO be a successful engineer, one must master certain techniques, certain details of procedure essential to expertness in handling the physical problems he will meet in his profession. This stress on techniques is strong not only in an engineering school, but in our highly industrial society as a whole. Due to this emphasis it is not surprising to observe the development of a materialistic trend in the modern mind, for such a trend will result from the application of the methods of the engineer to all of man's problem areas. The worship of technique is hardly understandable when one considers the many and varied problems that confront man in this complex world, many of which problems cannot be satisfactorily subjected to a purely materialistic analysis.

The training one receives in an engineering school, excluding the attempts at cultural broadening which are, at best, a side light, is aimed at the development of assorted skills which may be used in handling the problems of engineering and science. The physicist learns the mechanisms by which one kind of energy may be converted into another more useful form. The chemist is taught how to use chemical formulae and the molecular theory to create various substances. The major emphasis is necessarily on immediate methods to be used in solving specific problems; "necessarily" because the problems facing the engineer become increasingly complex with the advance of technology. More and more time must be spent in learning specific techniques, with the danger that the engineering school can afford to spend less and less time on other subjects of not so definite applicability in the engineer's work. The courses which are offered for the student's cultural development tend to be considered a waste of time by the student already burdened by his load of scientific courses. As a result of his forced preoccupation with technical subjects, the student is in danger of forming the habits of thought referred to by Philip Wylie in his *Essay on Morals* when he describes engineers as "imitators, that is to say: tinkers, not thinkers."¹

Today's American hero is the engineer. We glory in "American ingenuity," in our mass-production economies and assembly-line techniques. Glowing words are written in praise of the doer as opposed to the talker — or thinker. Henry Ford, a hero of American industry, wrote, "With the changing wheel of ambition, boys no longer regard the talkative professions as more important than the manual . . . gigantic tasks . . . will be accomplished by doers rather than talkers."² And so it goes. Ours is a country where a premium is placed on results one can see. A man

who can build a bridge, or turn out more shoes for less money, can add something tangible to the wealth of the nation. Why then should he not be entitled to praise and riches? And why should everyone not try to imitate his achievements? We boast of material progress and an improved standard of living. The car in every garage and the movie every Saturday night are the ultimate signs that America has achieved success. "For half a century . . . the articulate intellect of the West has been satisfied that the Grail will be found by the scientific method."³ Our environment — practical, scientific, industrial America — is such as to make technique appear to be the *sine qua non* of all man's activities.

The popularity of the scientific method has led to the present prevalence of materialism. Especially among engineering students do we find contempt for the phases of human experience which cannot be handled by scientific techniques. A large number of science students have atheistic or agnostic tendencies. This seems no more than natural when one considers the success of the scientific method which is displayed daily to the engineering student in his courses of study and to the layman by the material riches created for him by science and engineering. When all things are reduced to the units of science and anything which cannot be reduced to those units is not conceded to exist, it is impossible to have other than a materialistic philosophy. For if every event can be explained on the basis of the action and reaction of atoms, if thought itself is nothing more than the stimulation or retardation of certain cells of the brain, where is there room for any inspiration, any divine guidance, or anything else which is intangible or immaterial? The extent to which this materialism is apt to run is indicated by the remarks of one student at M.I.T. who in all seriousness denied the existence of any moral or spiritual values in the world. He can conceive of no God that is not a natural force like the force of gravity or a physical entity made up of atoms and molecules. In his world, a world where, knowing the natural forces operating at any given time the only reasonable course of action one can follow is one which conforms to the direction of these forces, the concept of right and wrong has no significance. Hitler's treatment of the Jews was reasonable to him since it helped Hitler achieve the results he sought. When all is reduced to this materialistic interpretation, the problems of life seem extremely simple. The scientist's answer is always the one right solution. The age of reason is man's golden age. In the flush of this discovery Thomas Paine triumphantly announced his agnosticism. Robert Ingersoll was able to write in *Why Am I an Agnostic*, "In this mighty panorama of national (Concluded on page 230)

³ Wylie, *op. cit.*, p. 6.

¹ New York: Rinehart and Company, 1947, p. 16.

² *My Philosophy of Industry* (New York: J. B. Lippincott Company's American Issues by Thorp, Curti, and Baker, 1944), p. 968.

Bridges or Stepping Stones?

In which Is Raised the Question of the Degree to which Youth Should Be Aided by the Experience of Mature Engineers

BY DUGALD C. JACKSON, JR.

THERE appeared in the bulletin of one of the well-known engineering societies a brief article entitled "Building Your Bridge." To the members of that engineering society the author suggested a realistic method of applying to their society activities the underlying thoughts of William Allen Dromgoole's familiar poem. Although the ideas expressed in that article are good, full consideration seems not to have been given to the thinking and actions of many engineers — from recent graduates to long-time leaders in the profession.

As Review readers will recall, Dromgoole's poem tells the story of an old man who having crossed a swollen stream with difficulty paused when on the other side to build a bridge to aid others — particularly young men — who might follow him. The editorial comment on this spirit of helpfulness was: "A fine philosophy — one which could be followed by some of our older and esteemed members of the engineering profession. They too should pause on the far side of a successful engineering career and lend a helping hand to the youth who soon will have to cross many chasms on the road to success."

Certainly we cannot take exception to the philosophy of the old man in the poem: Especially commendable is the matter of converting his academic philosophy of life into an active manner of living. Nor are the thoughts of the commentator to be decried. It is the peculiar obligation and opportunity of all engineers as professional men, particularly those with many years in the active practice of the profession, to extend a helping hand to the rising young engineers, the neophytes in the profession, by making available to them in a tangible and practical manner the lessons learned and the judgment gained from years of experience.

The one criticism of the poem and the comment on it concerns the amount of aid accorded the youth (the young engineer) rather than the method, and the implication by the commentator that "our older and esteemed members of the engineering profession" do not make a point of lending a helping hand.

Considering first the commentator's implication, let us answer the question: "Are the leading members of the engineering profession doing anything to assist the young engineers; are they building 'a bridge to span the tide'?" And again, "What proportion of the older engineers are extending a helping hand, and how long have they been doing it?"

The categorical answer to the last half of the second double-barreled question is: "More than 40 years." When he was president of the American Institute of Electrical Engineers in 1902-1903, the late Charles F. Scott with the support of T. Comerford Martin, Harris J. Ryan, and other leading engineers initiated local sections

and student branches in the American Institute of Electrical Engineers for the benefit of less experienced engineers and even for students who had not yet entered the profession. Engineering matters, both past experiences and plans for the future, have been discussed at the meetings of the sections and branches ever since their establishment. In these meetings, leading members of the profession have set forth their experiences and expressed their opinions on engineering problems of import, to the great advantage of the young engineers and the engineering students who can afford neither the money nor the time to attend the national and regional conventions. At section meetings, also, young engineers have become personally acquainted with leaders in the profession, with resultant enhancement of their technical knowledge and enlargement of their professional perspective. Actions similar to those of the American Institute of Electrical Engineers have long been taken by all the major engineering societies.

Such activities for the benefit of the younger engineers undoubtedly could have been brought about and their development fostered by only a relatively few leading and influential engineers. Was this the case? The answer is an emphatic "No!" I cannot speak from personal knowledge of the period prior to the first World War, but let me draw upon my experience in the East, the Middle West, and the South since World War I.

Of the many engineers whom I met, I can remember none, with 10 or more years of professional experience, who was not genuinely interested in the problems and progress of the younger engineers and ready to advise and help them. Granted, many of these older men did not make an active effort to determine how they could best aid the young men, but relied on the latter to approach them for advice. Nevertheless, numerous young engineers benefited, through this passive form of assistance, from the advice and experience of older men. Moreover, besides those in education, a good 25 per cent of engineers, beyond 50 years in age, were devoting considerable time and thought toward making their experience available to younger men and toward encouraging other older men to do likewise.

The results of these efforts provide the answer to the first question we asked. Over the past 25 years various steps have been taken by the Founder Engineering Societies to implement in a practical way the helping-hand policy. One of these steps was the establishment, in the larger sections of the American Society of Mechanical Engineers, of subgroups composed of and run by the junior members with the advice, and assistance when desired, of some of the older experienced members. This provides an opportunity for the (Continued on page 224)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

To Direct Athletics

MEMBERSHIP of the new Athletic Board, which succeeds the Alumni Advisory Council on Athletics as the advisory and policy-making body concerned with the Institute's athletic program, was recently announced by President Compton.

H. Guyford Stever, Assistant Professor of Aeronautical Engineering, has been appointed chairman of the board for a term of two years. The alumni members are William W. Garth, Jr., '36, and Lewis T. Jester, Jr., '41. The student body will be represented by William J. Hart, '48, Henry L. Henze, '49, and Duane D. Rodger, '48. The Faculty member, in addition to Professor Stever, is Professor Ronald H. Robnett, who will serve for three years. Ex Officiis members of the board are Dean Everett M. Baker, Dr. Dana L. Farnsworth, and Ivan J. Geiger.

In a letter to each member of the board, President Compton expressed his appreciation for their willingness to serve and outlined their duties. The appointment of Mr. Geiger as director of athletics, he pointed out, will permit the board to give the maximum amount of time to matters of policy.

The major functions of the new board will be to formulate policies to insure the most effective athletic program for the Institute's student body and to act in an advisory capacity to the President's Office and to the student management in matters affecting intercollegiate sports. The new board is expected to abide by the traditional Institute philosophy of encouragement of the maximum possible freedom of students in the management of their own affairs through their own system of student government. The board will act with power in the awarding of athletic letters and other awards and in the determination of eligibility to compete in intercollegiate sports. The athletic coaches will be responsible to the director of athletics under the general supervision of the Athletic Board. The Undergraduate Budget Board, of which Dean Baker is chairman, will be responsible for recommending the appointments, including salaries, of the athletic staff.

Honoraria

TWO members of the M.I.T. Faculty have been honored by the War Department for outstanding services performed during World War II.

William R. Hawthorne, '39, Associate Professor of Mechanical Engineering, who came from England to join the Institute's staff, was awarded the Medal of Freedom with bronze palm, the highest award within the power of the War Department to bestow on a civilian of a foreign country. The award was given for "very meritorious service in scientific research and development. An expert in the field of jet propulsion, gas turbines, and combustion, in the British Ministry of Aircraft Production, he did much to correlate British and American engineering efforts in that field and made available his own advice and counsel and the results of British research, greatly aiding

the planning of American scientific programs." The medal was presented to Dr. Hawthorne by Colonel Harold R. Jackson, Head of the Department of Military Science and Tactics at M.I.T.

The Certificate of Merit, bearing the signature of President Truman, was awarded to Harold C. Weber, '18, Professor of Chemical Engineering, by Major General Alden H. Waitt, '14, of the Chemical Warfare Service. The certificate bore the citation: "for outstanding fidelity and meritorious conduct in aid of the war effort against the common enemies of the United States and its allies in World War II."

The presentations were made in the President's Office in the presence of Dr. Compton and members of the staffs of the recipients' Departments.

Alumni and Alumni-to-be

FRESHMEN numbering 37 who are sons of M.I.T. Alumni registered in the first-year class this fall. The Institute is especially proud of the occasion when an alumnus wishes his son to "come back to Tech" and doubly so when the son manifests his own wishes by enrollment at M.I.T. The listing follows:

Son	Father
Noel T. Adams	Frederick W. Adams, '21
Lee Brodsky	Saul Brodsky, '26
Ray C. Burrus, Jr.	Ray C. Burrus, '22
Zenas Crocker, 3d.	Zenas Crocker, Jr., '18
Philip M. Currier, Jr.	Philip M. Currier, '14
Foster P. Doane, 3d.	Foster P. Doane, Jr., '20
Bradford W. Edgerton	Earl M. Edgerton, '25
Herbert W. Eisenberg	Samuel S. Eisenberg, '15
Hasbrouck Fletcher	Ralph A. Fletcher, '16
Thomas R. Friedrich	Valentine Friedrich, Jr., '22
Ernest A. Grunsfeld, 3d.	Ernest A. Grunsfeld, Jr., '18
Robert L. Hardy	Arthur C. Hardy, '18
Richard S. Halsey	John C. Sweeney, '10 (deceased)
Myron A. Hoffman	Saul A. Hoffman, '16
Windsor H. Hunter	Frederick L. Hunter, '19
David A. Kallander	Ernest L. Kallander, '24
Thomas E. Kelly	Thomas P. Kelly, '18
John M. Lee	John G. Lee, '21
Harry N. Lowell	William P. Lowell, Jr., '26
Francis B. McKee	Andrew I. McKee, '21
Theodore A. Mangelsdorf, Jr.	Theodore A. Mangelsdorf, '26
Walter E. H. Massey, 2d.	Denton Massey, '24
John R. Myer	C. Randolph Myer, Jr., '22
Robert A. Norcross	Austin S. Norcross, '29
Peter J. Preston	Joseph K. Preston, '23
Bruce D. Replogle	Delbert E. Replogle, '24
John D. Robertson, Jr.	John D. Robertson, '16
Robert M. Rubin	Richard B. Rubin, '28
Arthur H. Schein	Sumner Schein, '21
David E. Schoeffel	Erwin G. Schoeffel, '23
Peter L. Silveston	Barnett Silveston, '27
Christen Smith	Gabriel Smith, '22
Paul G. Smith	Charles S. Smith, '22
Selden B. Spangler, Jr.	Selden B. Spangler, '32
Thomas A. Thornton	Charles E. Thornton, '21
Robert D. Thulman	Robert K. Thulman, '22
Donald R. Walton	James C. Walton, '23



At St. George's Bay, near Antigonish Harbor, Nova Scotia, the Crystal Farm (above) has been selected headquarters for the new Institute of Geology, joint project of M.I.T. and the Department of Mines of Nova Scotia. Students from M.I.T. and the universities of Nova Scotia will find unusual opportunity for carrying out geological field studies while living in close contact with the instructing staff in delightful surroundings shown here.



The long Central Hall on the main floor of Crystal Farm (above) will be the center of recreational activities for students and Faculty members who have the good fortune to study geology at the new Institute of Geology. A corner of one of the main-floor living rooms is shown at the left.

Photos by The Russell Studio

Geology Field Station

AIMING to broaden the scope for training and research in its field, an Institute of Geology has been established in Nova Scotia under the joint auspices of M.I.T. and the Nova Scotia Department of Mines. Arrangements for the co-operative project were completed recently by Premier Angus L. Macdonald of Nova Scotia and Walter L. Whitehead, '13, Associate Professor of Geology, representing Professor Warren J. Mead, Head of the Department of Geology at M.I.T., at a meeting attended by representatives of the Department of Mines, leading universities of Nova Scotia, and industrial concerns.

Headquarters of the new Institute, which is to open next summer, will be at Crystal Farm on St. George's Bay near Antigonish Harbor in Nova Scotia. The location for the Institute was selected because of the unusual advantages presented in that region for geological training, the variety of formations of structure being ideal for the instruction of undergraduates and graduate students in geology.

Under the new plan, members of the Faculty at M.I.T. will give Technology's required courses in summer field training in geology and associated sciences at the new field station. Students in geology from Nova Scotian universities will have the opportunity to join M.I.T. students in these courses, and students from other colleges of the maritime educational institutions and elsewhere will be considered if facilities permit.

The St. George's Bay region has historical association with the early development of geological sciences in Canada and the Maritime Provinces, and the classical sections described by Sir John William Dawson and other

world famous pioneers in geology are nearby on the coast of Cape George near Arisaig.

The field training program this summer will be conducted by a group of professors from M.I.T. and from Nova Scotian universities, and it is expected that approximately 25 students will be registered for the program. The curriculum will cover a period of eight weeks, of which the latter part will be devoted to practical field mapping and more detailed studies related to the natural resources of Nova Scotia. This co-operative venture in a geological education was initiated by Professor Whitehead of M.I.T., Dr. Donald J. MacNeil of the University of St. Francis Xavier, and the Nova Scotia Research Foundation, and is sponsored by the Nova Scotia Department of Mines.

The Institute of Geology will be governed by a board, the members of which are expected to include the Honorable Malcolm Patterson, Minister of Mines for Nova Scotia; Professor Whitehead; Robert R. Shrock, Associate Professor of Geology at M.I.T.; Dr. MacNeil; Harold D. Smith, President of the Nova Scotia Research Foundation; Dr. G. Vibert Douglas and Dr. M. Bancroft, geological consultants; C. M. Anson, General Manager, Dominion Steel Company, and Harold Gordon, General Manager, Dominion Coal Company; and Robert D. Howland, Vice-president of the Nova Scotia Research Foundation.

The idea of summer studies by geological students in western Nova Scotia developed from work done during the past six years by two M.I.T. professors studying the petroleum reserves of the Acadian region. Cape Breton Island and the mainland from Canso Strait south to Cape George and Pictou were recognized to have almost every feature useful in teaching field geology to students. In this area, within a radius of 50 miles from the shore of

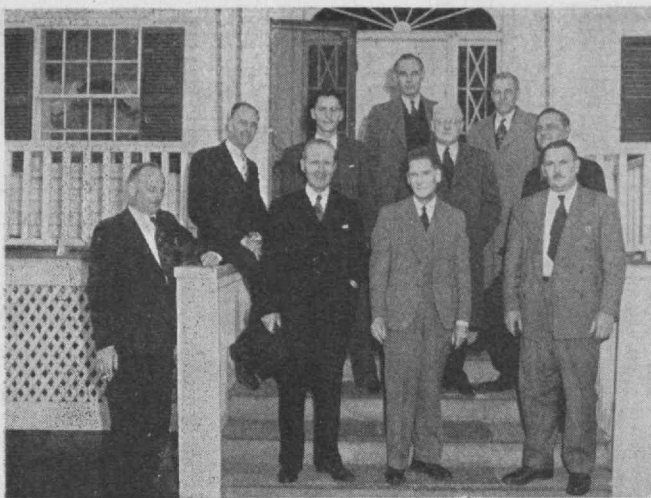


Photo by The Russell Studio

Meeting at Crystal Farm to form the Institute of Geology at which M.I.T. students and Faculty will study during the summer months are, in usual reading order, (first row): Allan E. Cameron (hand on railing) President, Nova Scotia Technical College; Honorable Angus L. Macdonald, Premier of Nova Scotia; Walter L. Whitehead, '13, Associate Professor of Geology at M.I.T.; Harold D. Smith, President, Nova Scotia Research Foundation; (second row): Donald J. MacNeil, University of St. Francis Xavier; Robert D. Howland, Vice-president, Nova Scotia Research Foundation; Honorable Malcolm Patterson, Minister of Mines for Nova Scotia; C. M. Anson, General Manager, Dominion Steel Company; (third row): Harold Gordon, General Manager, Dominion Coal Company; and J. P. Messervey, Deputy Minister of Mines.

St. George's Bay at Crystal Farm, is an assemblage of varied types of rocks ranging in age from extremely ancient formations to young deposits of the Glacial period. Mines and quarries are being worked in these rocks, several wells have been drilled for oil, the deepest to about a 12,000-foot depth, and many prospects for metals have been discovered. It is a region rich in both practical problems awaiting study and in traditional scientific interest.

Some of the earliest geological research in North America was done here. From 1843 to 1856, Sir John William Dawson made pioneer field studies later published in his monograph *Acadian Geology*. Much of his work was done along the shores of Northumberland Strait and on Cape Breton Island. The famous Joggins coal beds on the Bay of Fundy, where upright tree trunks are found in the coal with roots extending downward into shale, were described in 1845 by Sir William Logan, first director of the Geological Survey of Canada. Later William Barton Rogers, founder of M.I.T., visited this Nova Scotian area and wrote about its geology.

Dawson said: "The old and beautiful name Acadia . . . though it has a classic look and sound, is undoubtedly of aboriginal origin . . . and signifies . . . a place of plenty or abundance." His geological knowledge persuaded him that the natural mineral resources of Acadia, properly New Brunswick, Prince Edward Island, and Nova Scotia, had great value.

Crystal Farm is 650 acres in extent, with one-half mile on St. George's Bay. The house was built 80 years ago by the Crerar family and is well preserved. It is furnished suitably for its colonial style. Large breakfast, dining, and living rooms are adequate for the 30 students to be enrolled in 1948 and six large bedrooms are available for staff and visitors. A barn with hardwood floor 100 by 40 feet and great open fireplace provides an assembly room.

Student sleeping quarters are to be in cottages now being erected. The Nova Scotia Department of Mines is arranging for a new water supply from springs above the house and for an electric power line to Crystal Farm.

The activities of the M.I.T. summer group will be intimately concerned with the study of these resources. The great coal mines extending under the sea at Sydney are 100 miles to the northeast of Crystal Farm. Those at New Glasgow and Pictou are 40 miles to the west. Other mines easily accessible are in the gold belt of eastern Nova Scotia and in gypsum-bearing beds.

An essential part of this joint project by M.I.T. and the Nova Scotian universities will be the geological study in detail of promising mineral and fuel deposits. Areas of interest will be suggested by the Nova Scotia Department of Mines and mapped by groups of students under close supervision by the Faculty members resident at Crystal Farm. The maps and reports will be a part of the governmental survey of the mineral resources of Nova Scotia. The nature of this work imposes real practical responsibility on students while in the field.

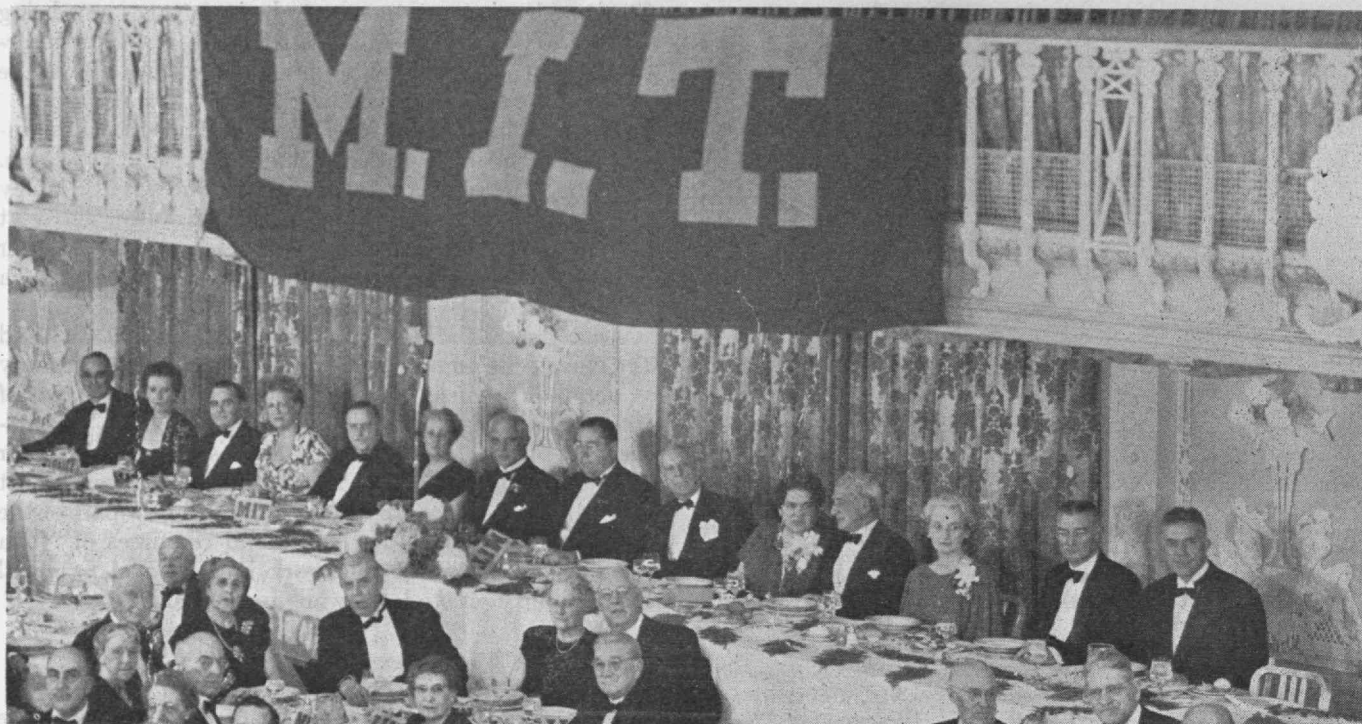
To Head Masonry Materials

APPPOINTMENT of James S. Murray as Associate Professor of Materials in the Department of Building Engineering and Construction was announced recently by Professor Walter C. Voss, '32, Head of the Department. Professor Murray will take charge of the Masonry Materials Research Laboratory, in which fundamental research on cementitious materials and masonry units is being conducted.

Professor Murray, who is a native of Cambridge, Mass., has been associated with the Warner Company of Philadelphia as director of research since 1930. His research with this company concerned dolomitic and calcium lime products, sand and gravel, and central mixed concrete. In his capacity of director of research he gained wide experience in production problems in his field, as well as servicing and development problems.

Educated in the public schools of Somerville, Mass., Professor Murray was graduated from Harvard University in 1924 with the degree of bachelor of science in industrial chemistry. During the period from 1924 to 1926 he held technical positions with the Naugatuck Chemical Company, Naugatuck, Conn., the New Departure Manufacturing Company, Bristol, Conn., and M. W. Carr and Company of Somerville, Mass. In March, 1926, he joined the staff of the National Bureau of Standards in Washington, serving as a junior chemist in the lime and gypsum section of the building materials division. His work there led to his promotion to chief of his section. Here he gained valuable experience in the evaluation of plasters, mortar materials, and sand-lime brick to determine their conformity with Federal specifications. As section chief, he was a representative on the Federal Specifications Board. His studies of building materials have included investigations of the use of lime, cement, and gypsum on actual construction projects.

Professor Murray is a member of the American Society for Testing Materials, in which he has been very active, having served as vice-chairman of one of the Society's committees. He is also a member of the American Institute of Chemical Engineers and the American Chemical Society.



Approximately 600 Alumni and their wives attended the Compton Dinner Party given by The M.I.T. Club of New York at the Hotel Biltmore on December 9, when President Compton delivered an address on "Superior Education." At the head table, in reading order, are: Alfred L. Loomis, member of the Corporation; Mrs. Thomas C. Desmond; Raymond C. Rundlett, '22, President, The M.I.T. Club of New York; Mrs. C. George Dandrow; H. E. Lobdell, '17, Executive Vice-president of the Alumni Association; Mrs. Gordon S. Rentschler; Dr. Karl T. Compton, President of M.I.T.; C. George Dandrow, '22, Chairman of the Compton Dinner; Alfred P. Sloan, Jr., '95, member of the Corporation; Mrs. Karl T. Compton; Gerard Swope, '95, member of the Corporation; Mrs. Raymond C. Rundlett; Gordon S. Rentschler, member of the Corporation; and Senator Thomas C. Desmond, '09, member of the Corporation.

Figures and Machines

WIDELY recognized as an authority in his field, Zdenek Kopal has been appointed associate professor of computational analysis in the Department of Electrical Engineering.

A native of Czechoslovakia, where he was born in 1914, Professor Kopal holds the degree of doctor of science from Charles University, Prague. He was a research fellow at Harvard College Observatory from 1938 to 1940 and a research associate in astronomy in the University from 1940 to 1943. He has been a research associate at the Institute since 1946.

Following his graduation from Charles University, where he also served as a member of the faculty while carrying on work for his advanced degree, Dr. Kopal in 1938 was awarded the Ernest Denis Fellowship at the University of Cambridge, England, and worked for the first half of his fellowship year under the late Sir Arthur Eddington. It was while he was studying in England that he was invited by the director of the Harvard College Observatory to join the staff as Agassiz Research Fellow. He came to the United States in 1938 and in the summer of 1939 he served as a lecturer at the Harvard Summer Conference on Astronomy.

His association with the Institute began in 1942 when he joined the staff of the Center of Analysis. He is particularly interested in the development of large-scale computing machines and has been closely associated with advanced computation at the M.I.T. Center of Analysis.

Dr. Kopal is a member of the Royal Astronomical Society, the American Astronomical Society, the Astronomical Society of the Pacific, the Society of Sigma Xi,

the International Astronomical Union, of which he is now an American representative. He is executive secretary of the Panel on the Orbits of Eclipsing Binaries of the American section of the International Astronomical Union.

Economics Award

PAUL A. SAMUELSON, Professor of Economics in the Department of Economics and Social Science, brought added honor to an already distinguished young career when he became the first winner of the John Bates Clark Silver Medal of the American Economic Association. The Clark Silver Medal is to be awarded approximately biennially to "that American economist under forty who is adjudged to have made the most significant contribution to economic thought and knowledge."

In making the presentation at the annual dinner of the American Economic Association in Chicago on December 28, Paul H. Douglas, President of the Association, cited Professor Samuelson for his "extraordinarily penetrating contributions to the theory of employment, production, distribution, and value."

At the age of 25 Dr. Samuelson became an assistant professor of economics and social science at M.I.T., and was promoted to associate professor in 1944. During this year he was granted leave of absence to serve as staff member of the Radiation Laboratory. Last July he was appointed professor of economics and social science. He is author of several books, including *Foundations of Economic Analysis** and *Economics: an Introductory Analysis*.†

* Cambridge, Mass.: Harvard University Press, 1947, \$7.50.

† In publication.

BUSINESS IN MOTION

To our Colleagues in American Business . . .

Perhaps it is because orders, particularly repeat orders, are definite proofs of satisfaction that comparatively few buyers take the trouble to give any other expression of their esteem. As a rule, some unexpected or special quality or service is required to draw forth compliments in writing. Hence Revere was exceptionally pleased to receive the following letter:

"As you may know, we have duplicate dies with several firms for reasons that are obvious. However, we recently ran an experimental time study on two batches of identical goods from your firm and from another source. The results will amaze you.

"We have found that for uniform quality and excellence of raw finish your extrusions stand head and shoulder above all other sources that we have had contact with since forming this corporation and with sources that the writer was familiar with before the war in the midwest.

"During the running of this study, we found that we could cut and color with a complex compound in a double pass on a pleated buff and produce a superior finish in a saving of up to one-half of the time it took us to produce a similar finish on the same item of the same alloy from another source.

"More important to us, however, was the fact that we find your materials to be much more consistent

and that we do not find that 'batches' make the difference that they seem to with goods from other reputable sources.

"If this information and the technical data relating to it can ever be of value to you and your firm, please feel free to call upon us at any time."

This heart-warming letter assured us again that the infinite pains taken in our laboratories and mills to maintain standards and specifications are continuing to guarantee the customer satisfaction without which we could not have survived for 147 years.



However, our purpose in revealing this letter was not to pat ourselves on the back, but to point up what we have said so often in the past: that a successful relationship between buyer and seller depends upon a full interchange of

information as to products and processes, successes as well as failures. No less than the compliment, the letter of complaint is also good business. A frank statement of the whys and wherefores of dissatisfaction supplies the information that makes corrective measures possible; without it, both parties may remain in the dark as to their real requirements and potentialities. Hence Revere suggests that no matter what you buy, nor from whom, brickbats are as essential as bouquets. Suppliers who know all the facts, good or bad, can always serve you better.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

☆ ☆ ☆

Executive Offices:

230 Park Avenue, New York 17, N. Y.

CONSERVATION AND ENGINEERING

(Continued from page 208)

Many engineers have not yet learned that any relation between the two exists. They need to learn that problems of water management and land management are inextricably interwoven. It is not possible for engineers to ignore the watershed behind the main rivers without ultimate disastrous results, both to their projects and to the nation. An increasing number of students of the problems believe that the overflow lands on the lower part of major rivers should be left as overflow lands for emergency use, and that the dikes should not be continually crowded closer to the river but should be moved farther back. The lands thus exposed to flooding are not wastelands as is popularly assumed. They produce quantities of fine timber, as well as fish and wild life in such abundance as to offset any additional agricultural value that may come by crowding the dikes closer to the river. The wider flood planes that remain furnish added protection to cities and towns farther down the river more cheaply, and much more certainly, than the continual multiplication of numerous engineering works for that purpose.

Stream straightening on slow, sluggish, very crooked streams may cause little interference with biological values. In fact, by creating additional oxbow lakes such operations have sometimes resulted in providing additional wild-life habitat. The straightening of streams with relatively steep gradient usually does damage to fish

and wild-life habitat and populations. Straightening of such streams often produces a scouring action that quickly destroys fish-spawning beds and aquatic growth. It may also cause a lowering of the water table and produce an intermittent stream. Under such circumstances stream straightening often proves to be a two-edged tool that should be used with care and discretion if it is used at all.

Navigation

The building and operating of navigation channels in such rivers as the Mississippi and Missouri, is another controversial subject in which the conservationists and engineers do not always see eye to eye. A series of dams on the upper Mississippi above St. Louis is operated solely for the purpose of maintaining a nine-foot river channel with little or no regard to the effect which such operations may have on the fish and wild-life populations. The volume of freight hauled on most of these inland waterways has seldom justified the cost of constructing and maintaining the channel. When, in addition, there is taken into account the destruction of recreational, fur, fish and wild-life values, and the loss of timber or agricultural production of the lands flooded to maintain the channel, this type of water transportation becomes very expensive. A growing volume of public criticism can be expected until all values of our natural resources are taken into account in planning, constructing, and managing the water levels and operating the locks and dams.

(Continued on page 220)



Sign of a Great Line of Materials Handling Equipment for 33 Years

Multiply your Manpower, Speed up Production, Cut Overhead, and Save Money with Lewis-Shepard Power Fork Trucks, "JackLift," "JackStacker," and "JackTractor," Power Model Trucks, Hydraulic and Mechanical Hand Lift Trucks, "JackLift" Trucks, Pallet Trucks, Pallet Stackers, Portable Elevators, Cranes, Floor Trucks, Skids, and Racks.

Write for New Catalog of this Great Line

LEWIS-SHEPARD

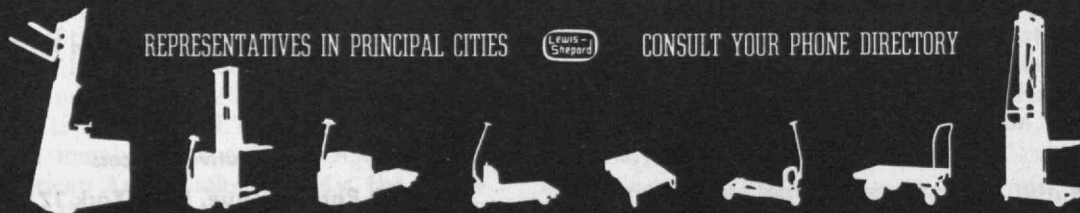
PRODUCTS INC.

251 WALNUT STREET WATERTOWN 72, MASS.

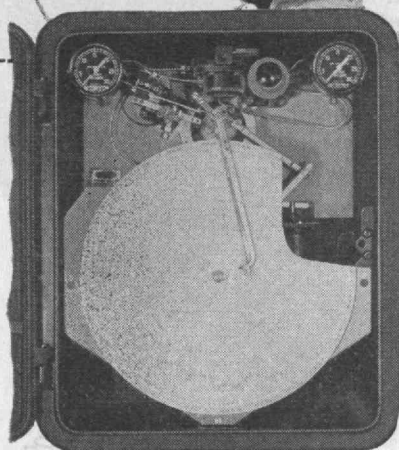
REPRESENTATIVES IN PRINCIPAL CITIES



CONSULT YOUR PHONE DIRECTORY

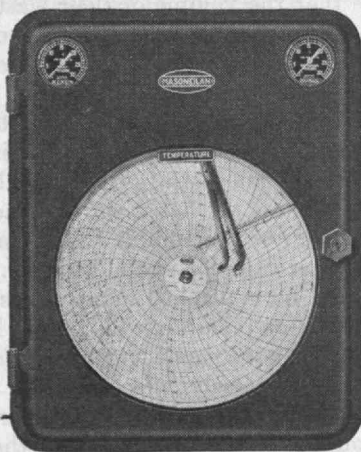


"I buy Masoneilan Instruments because of their simplicity, accessibility of all parts, ruggedness and dependable performance"



**No. 2110
PRESSURE CONTROLLER**

Proportional type, designed for precise control of pressure. Stable and smooth in operation. Proportional band adjustment throughout entire range without upsetting control. Ranges 30 inches Hg. vacuum to 3,000 psi.



**No. 3110
TEMPERATURE CONTROLLER**

Proportional type for exact control of temperatures in petro-chemical processes. Its smooth operation assures accuracy and uniformity under varying conditions. Ranges -100°F to 1100°F in recording and non-recording types.

Throughout the petro-chemical industry, engineers state their preference for Masoneilan Instruments because of the simplicity of operation and accessibility of all parts.

The simplicity of operating elements assures instant, uniform response under practically all types of operating conditions. The accessibility of all parts enables you to observe the working operation of every element.

Masoneilan Instruments, pressure and temperature, are available in indicating and recording types for a wide variety of control applications in the petro-chemical industries. Investigate these Masoneilan control instruments for your processes.

MASONEILAN

MASON - NEILAN REGULATOR COMPANY

1190 Adams Street, Boston 24, Mass., U.S.A.

Philadelphia • Houston • Pittsburgh • New York • Buffalo • Chicago • St. Louis • Cleveland • Tulsa • Atlanta
Los Angeles • San Francisco • Cincinnati • Mason Regulator Company of Canada, Ltd., Montreal and Toronto

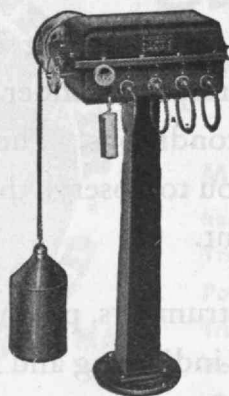
THE MURRAY PRINTING COMPANY

A Complete Printing Organization
Letterpress :: Offset :: Binding

18 AMES STREET
CAMBRIDGE

ROTO-TROL 940

**Multi-Position
Programming
Float Control**



*Write for
Bulletin 940*

The 940 is ideal for complex control of multi-pump installations. Any desired number of starting and stopping positions for each pump. Any sequence of operation — more uniform flow through use of maximum number of pump combinations.

*Other types of Roto-Trol Float
Controls are also available*

Water Level Controls Division of

HEALY-RUFF COMPANY

D. W. C. RUFF '07, President

771 HAMPDEN AVE.

ST. PAUL 4, MINN.

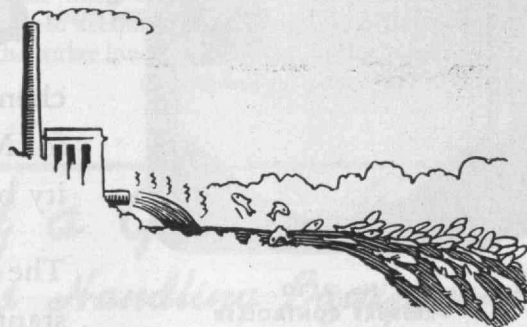
CONSERVATION AND ENGINEERING

(Continued from page 218)

Often the development of navigable channels has had somewhat unexpected results upon wild life. The construction of the intercoastal canal has brought salt water into many former fresh-water marshes with a resulting decrease in productivity. The damage varies from place to place, but it is fairly safe to generalize and say that the intrusion of salt water into a former fresh-water marsh decreases the productivity of that marsh by as much as one-half to two-thirds. In other words, as a salt marsh an acre of land will produce only from one-third to one-half of the food for waterfowl and fish which it produced as a fresh-water marsh. Development of the intercoastal canal has also impaired or destroyed locally important spawning grounds for shrimp, crabs and fish. At the time the canal was constructed no consideration was given to conservation measures. Much loss could have been avoided with little or no extra cost by appropriate planning in the early stages.

Pollution

Since the establishment of the first towns and the building of the first local industry in this country, it has been a common practice to dump untreated sewage and



industrial wastes into streams. When cities were small and industrial plants limited to small individual businesses, such undesirable practices mattered little. When cities grew so large that the volume of their wastes was greater than the stream could carry off and oxidize, domestic sewage became a problem from a biological standpoint. Pollution of streams by industrial wastes now has become a major problem of public health.

Pollution has been a major factor in decreasing the annual shad take and the harvest of other valuable fish in Atlantic coastal streams. It has been one factor in the decreased production of the Illinois River, once one of the major fresh-water fisheries in the country. These typical examples could be multiplied many times. Long conscious of the effects of pollutants on public health, citizens of this country have made vigorous efforts to control pollution that adversely affects health. These attempts have been only moderately successful since the volume of pollution has often grown faster than the curative measures.

It is only recently that the public has begun to understand the biological effects of pollutants. Public health and the prevention of moderate biological activity are two distinct and different things. Human or animal wastes, if unmixed with oil or chemical wastes, are not particularly harmful to biological production unless

(Continued on page 222)



"I've always been a part of your telephone service"

"You'll find my name on your Bell telephone — you see it on reels of cable being fed into manholes or strung on poles—you'll find it, too, on the complex equipment in your telephone exchange.

"As the supply member of the Bell Telephone team, I manufacture equipment, purchase supplies, distribute both to the telephone companies, and install central office equipment.

"Year in, year out, I help my Bell Telephone teammates to give you the world's *best* telephone service at the *lowest possible cost*.

"Remember my name—it's Western Electric."

MANUFACTURER... PURCHASER... DISTRIBUTOR... INSTALLER...



of 43,000 varieties of telephone apparatus.



of supplies of all kinds for telephone companies.



of telephone apparatus and supplies.



of telephone central office equipment.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882



Safety and **EFFICIENCY**®

VENTALARM

**SIGNAL
OFFERS BOTH!**

Commercial and private car owners now enjoy double dividends—in safety and fast-filling, non-spilling efficiency—from VENTALARM-equipped automotive gas tanks.



VENTALARM completely eliminates the waste and hazard of spilled gasoline... stops overflow, blow-backs, and "splash" filling. This Audible Tank Fill Signal permits use of full pumping speeds, creates an automatic expansion zone within tank. Sub-surface filling prevents evaporation.

**SCULLY
SIGNAL COMPANY**
Cambridge 41, Massachusetts

Fifteen makes of passenger vehicles, buses, trucks and taxicabs now include VENTALARM as standard factory equipment.



The RUMFORD PRESS

CONCORD
NEW HAMPSHIRE



WHERE
Printing
IS STILL A CRAFT

CONSERVATION AND ENGINEERING

(Continued from page 220)

they accumulate to a sufficient degree to utilize nearly all of the oxygen from the water. In fact, in moderate quantities they act as a fertilizer and increase the biological activity of the water. Conversely, human and animal wastes are particularly objectionable from a public health standpoint. On the other hand, many industrial wastes that may be present in quantities so small as to be unimportant to the public-health standard may easily be destructive to the aquatic biology. Industrial pollutants do not need to be present in sufficient volume to kill fish directly to destroy biological values. They can do so quite as effectively, if somewhat more slowly, if they prevent the growth of the small aquatic creatures that provide the basic food supply in the water.

Public interest is slowly becoming a force to compel remedial action by industries formerly reluctant to take corrective measures. A new group of specialists, including biochemists, chemists, physicists, and industrial engineers, are attempting to devise methods of handling pollutants other than by dumping them into the streams. Many of these efforts have already been successful but there is still much work to do in devising methods and means of getting them in use. Conservationists take the position that the only way to gain headway in reducing pollution is to stop immediately the building of new sources of pollution and then gradually to clean up the pollution that exists today. This conviction is based upon the experience over the past 40 years. During this period, particularly since 1930, considerable progress has been made as a result of the installation of several hundred community sewage disposal plants and a growing willingness on the part of major industries to install treatment units. World War II stopped most of this progress when it became impossible to secure either material or labor.

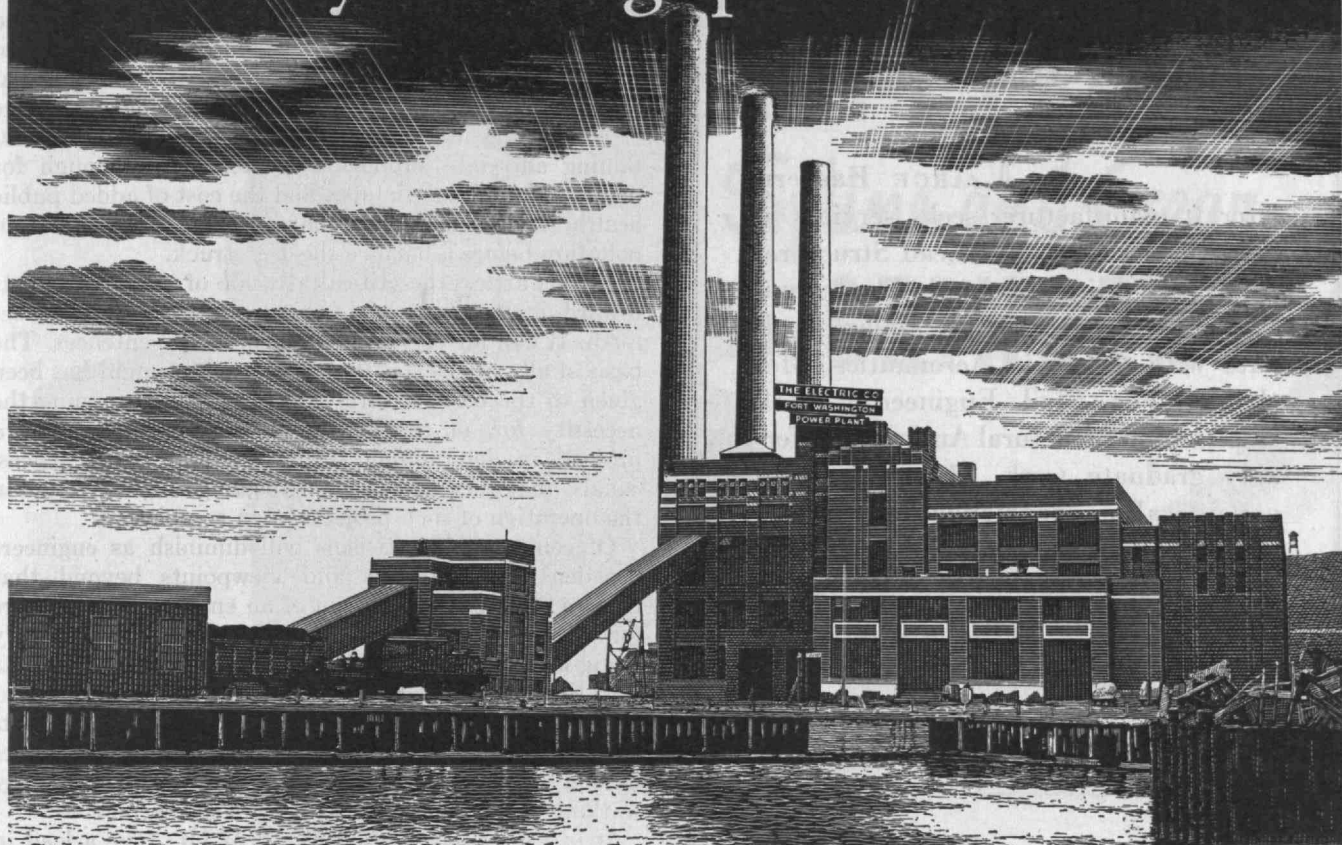
The war's demand for increased production caused the construction of many plants that emptied their wastes into waters that had not previously been seriously polluted. It concentrated human populations in areas where no adequate sewage treatment plants existed and overloaded hitherto adequate plants far beyond their capacity. In the opinion of many students of this problem, there is now more area of polluted water than ever before in the history of the country and the nationwide condition has not improved.

As the population increases, the demand for food will increase. This will result in increasing public demand that the productivity of rivers be restored. Such a restoration job will take time, but both industrialists and prospective sanitary engineers can expect some such program to develop. To a conservationist there is little logical justification for the destruction of these public water values for the benefit of any industry no matter how important. It is not always, as is often asserted, a question of whether or not industry can exist, but whether or not greater or somewhat smaller profits can be made if adequate treatment facilities are provided for handling industrial effluents.

There is little logic in permitting the destruction of public waters used for recreational purposes, such as swimming, and then appropriating public money to build

(Concluded on page 224)

History-making power stations



No. 6 — Port Washington Station — WISCONSIN ELECTRIC POWER COMPANY

When the Port Washington Station of the Milwaukee Electric Railway and Light Company (now Wisconsin Electric Power Company) went into service in 1935, its steam generating unit was the highest capacity, super-pressure boiler ever installed in a utility power station. It was as high as an eight-story building and as wide as a six-lane highway. Its drums, each forged from a single ingot, were sixty feet long with seamless walls five and a quarter inches thick, and each weighed seventy-five tons.

History-making as these figures seem, they merely highlight a more startling fact. This mammoth unit was, and is, the sole source of steam for an 80,000-kw turbine-generator. Thus Port Washington was the first large central station to go into service relying on a single boiler. The decision to place this confidence in the boiler resulted in a large initial saving in station cost and has been amply justified by the unit's record of reliability. In the eleven years since its installation, it has been available for service 95 per cent of the total elapsed time.

During 1936, its first full year of operation, Port Washington set a record for efficiency by operating at a lower average rate of coal consumption per kilowatt-hour than any other steam power station. Even more remarkable is the fact that today its overall station efficiency continues to be the standard by which steam station performance is measured.

In its expansion of recent years, Port Washington has recognized the fine performance of its original C-E boiler installation by placing repeat orders for three additional C-E Units. The first of these went into service in 1943, the second is about to go into operation and the third was ordered early this year.

The association of C-E with Port Washington and many other power stations that have made history speaks for itself. The experience, special skills and engineering which have brought about this association are available to you, whether your capacity requirements be as small as 1,000 lbs. of steam per hour or as large as 1,000,000.

These three factors are the unwritten plus-values in every C-E contract —

Knowledge — to solve today's, and tomorrow's, steam generating problems.

Experience — to interpret, from a world-wide background in every important industry, the specific needs of each installation.

Facilities — to manufacture complete steam generating units for every capacity from 1000 pounds of steam per hour up to the largest. B-161

**COMBUSTION
ENGINEERING**

200 MADISON AVENUE • NEW YORK 16, N. Y.

WANTED

Chief Structures Engineer

LARGE Eastern aircraft manufacturer seeks services of Structures Engineer to head Structural Analysis, Testing, Research, Flutter and Vibration Groups. Must be college graduate with degree in Aeronautics, Mechanical, or Civil Engineering with emphasis on Structural Analysis, preferably graduate work. Must have had considerable experience in aircraft structural analysis. Starting salary approximately \$8,000.

Reply Box E

The Technology Review
M.I.T., Cambridge 39, Mass.

TRADITIONAL
SYMBOL
OF
DEPENDABILITY
AND
LOW
OPERATING
COST
SINCE
1889

Built by the
BATH IRON WORKS CORP.

Shipbuilders and Engineers
BATH, MAINE, U.S.A.

HULL NO. 284
1947

BUILDERS OF PRIVATE, COMMERCIAL AND NAVAL VESSELS

CONSERVATION AND ENGINEERING

(Concluded from page 222)

chlorinated swimming pools. There is little logic in shipping in supplies of fish and other aquatic food from a distance to replace those destroyed at home. There is no more logic in providing other expensive amusements to substitute for the lost fishing, boating, and other recreational opportunities. Certainly in assessing the value of a polluting industry, the cost of building and maintaining adequate supplies of water, clean enough for domestic and industrial use, and the cost of added public health services should be charged against the source of pollution before a balance sheet is struck.

In this article the critical attitude of conservationists toward many great engineering projects has been set forth. It can all be summed up in a few sentences. The basis of all criticisms is that little or no thought has been given to the basic natural resources in determining the necessity for, or the benefits to be expected from, a project, in determining the location of dams, levees, canals, and other waterway engineering structures, and in the operation of such projects upon completion.

Of course such criticisms will diminish as engineers broaden their interests and viewpoints beyond that required for the mere design of an engineering structure for a restricted and local area. Some engineers are already doing so. However, it is the view of many conservationists that the nation never will get full values for its huge expenditures for construction of water management projects until an understanding of the basic scientific principles of land and water management is a part of the everyday working philosophy of the engineers themselves.

It is a great satisfaction to see M.I.T. take a lead in introducing such information into its courses. I hope that the work will be successful and that the example will become contagious and spread rapidly to other engineering schools.

BRIDGES OR STEPPING STONES?

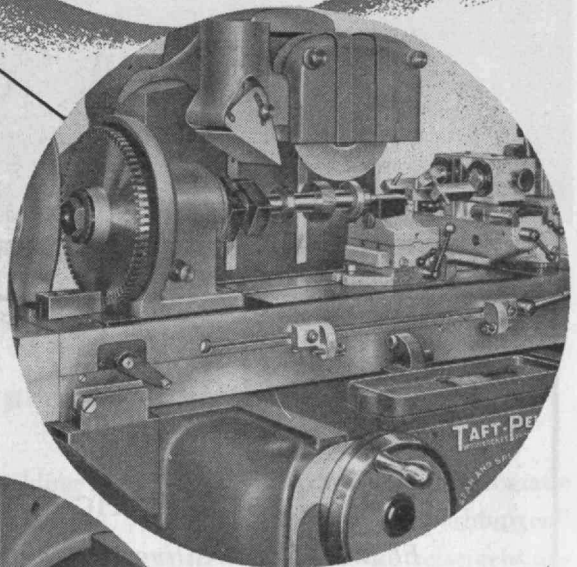
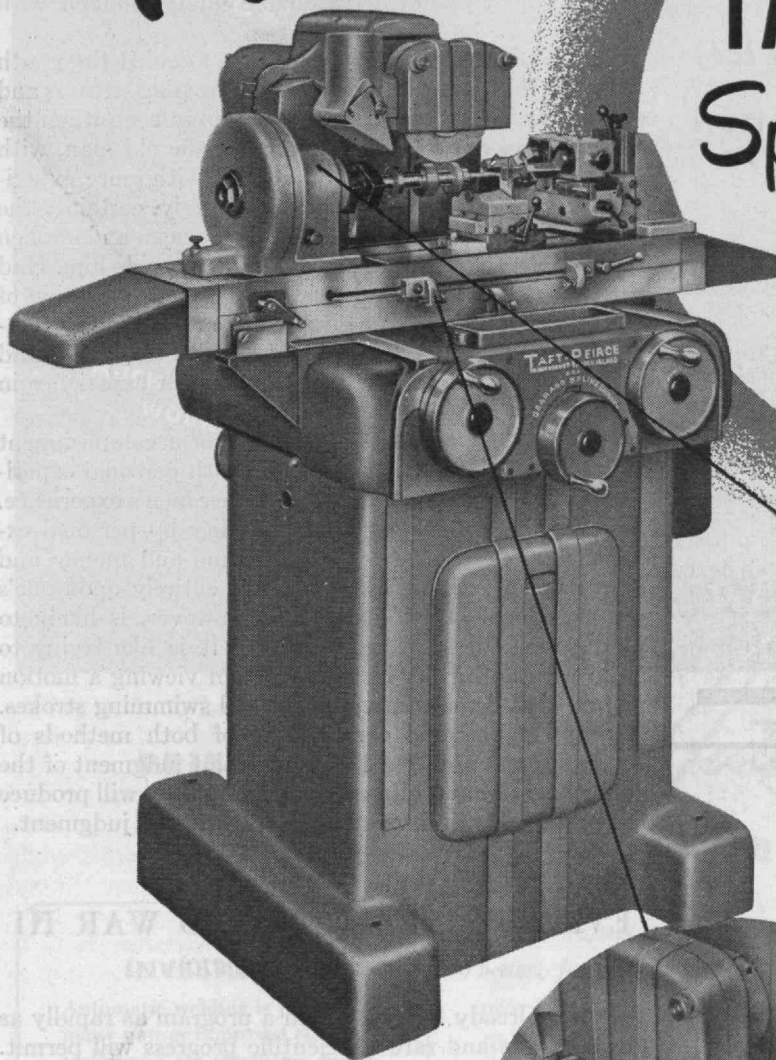
(Continued from page 212)

juniors to participate earlier in section activities and to use and profit more easily from the experience and counsel of older engineers, some of whom meet with them as advisers. The Engineers' Council for Professional Development, established in 1932, has been working steadily (though not as rapidly as some of the more impatient members of the profession would like) to aid the young engineer develop himself to professional status, particularly through its Committee on Professional Training. More recently the major engineering societies (particularly the American Society of Civil Engineers and the National Society of Professional Engineers) and many individual older and influential engineers successfully participated in efforts to alleviate the adverse effect of the Wagner Act on engineers, as the largest numbers affected by that Act were the young men. The result of their efforts was the inclusion in the Taft-Hartley Act of sections protecting the interests of all professional employees. These are three of numerous concrete evidences that individual engineers generally are giving active attention to the assistance of the younger men.

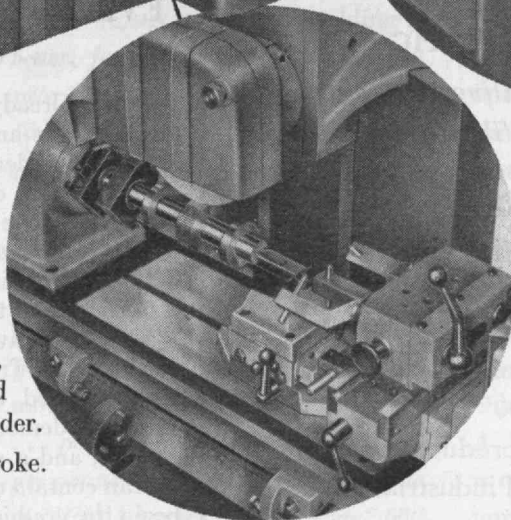
Now we come to the crux of the matter, the amount of
(Concluded on page 226)

New

TAFT-PEIRCE Spline and Gear GRINDER



▲ Above: Details of table, tailstock, and workhead construction, with index plate (uncovers) at left.



◀ At Left: Grinding a gear on the new Taft-Peirce Spline and Gear Grinder.

TAFT-PEIRCE NOW ANNOUNCES a small semi-automatic grinder which produces fine-pitch gears and splines to extremely close tolerances. *Add up these features:*

RUGGED, COMPACT, EASY TO OPERATE. This machine has the same base, column, spindle-head, and bearings as the famed Taft-Peirce No. 1 Precision Surface Grinder.

AUTOMATIC INDEXING at the end of each stroke. Master plates assure precision spacing.

ADJUSTABILITY OF INDEX cams eliminates unnecessary traverse motion.

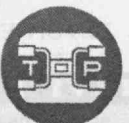
QUICK ARBOR-REMOVAL by lever-operated tailstock. **WHEEL-DRESSING DURING WORK-CYCLE** permitted by special 3-diamond wheel-dresser.

POSITIVE LOCKING of cross or longitudinal travel.

Write for Bulletin T6 to The Taft-Peirce Mfg. Co., Woonsocket, R. I.

T-P means TOP PRECISION

Visit **TAFT-PEIRCE**
at the Machine Tool Show - **BOOTH 601**





CO₂

GAS . . . LIQUID . . . SOLID (Dry Ice)

THE LIQUID CARBONIC CORPORATION

3100 South Kedzie Avenue, Chicago 23, Illinois

U. S. A.

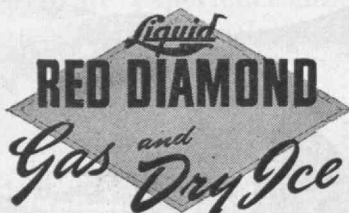
28 Producing Plants
More than 50 Distributing Points

CANADA

Halifax to Vancouver

OVERSEAS

England, Cuba, Mexico, Venezuela,
Colombia, Trinidad, Brazil



TRADE MARK
HEVI DUTY
REGISTERED U. S. PAT. OFFICE

Hevi Duty Electric Co.

Electric Heat Treating Furnaces

Surges Dry Type Transformers

MILWAUKEE 1, WISCONSIN

Hevi Duty Precision Electric Heat Treating Furnaces are built in a large variety of types and sizes — for many heat treating operations — with temperature ranges to 2500° F. (1371° C.). They are standard production equipment in many national industrial plants.

Write for descriptive bulletins

HAROLD E. KOCH '22, *President*

ELTON E. STAPLES '26, *District Manager, Cleveland*

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY
MILWAUKEE 1, WISCONSIN

BRIDGES OR STEPPING STONES?

(Concluded from page 224)

aid the older engineers should give to the younger men. Should the old man in the poem have built a complete bridge, or should he merely have set markers so that the youth could cross with reasonable safety, though with effort?

By building the bridge, the old man denied the youth the opportunity to gain experience in crossing streams and chasms, which experience he would sorely need when the old man had ceased his travels. Since the old man, with less physical vigor than the youth but with more experience and sounder judgment, crossed safely, certainly the youth could have crossed the yawning chasm and swollen stream if the old man had set markers to guide him. Had the latter tarried awhile longer, delaying construction of the bridge, he could have given the youth the more valuable experience of building it himself with the advice and assistance of the old man who had greater experience in such matters.

Judgment is gained and capability of accomplishment is developed through experience — both personal experience and the study and analysis of other men's experience. Acquisition of judgment and capability by personal experience alone can be wasteful of time and money and even dangerous at times. Depending entirely upon one's observation of others' experience, however, is likely to produce even less successful results; it is like trying to swim with no further instruction than viewing a motion picture that demonstrates the several swimming strokes. A properly balanced combination of both methods of gaining experience, based upon the joint judgment of the young engineer and his supervisor or adviser, will produce the best results in developing capability and judgment.

EVITABILITY OF WORLD WAR III

(Continued from page 210)

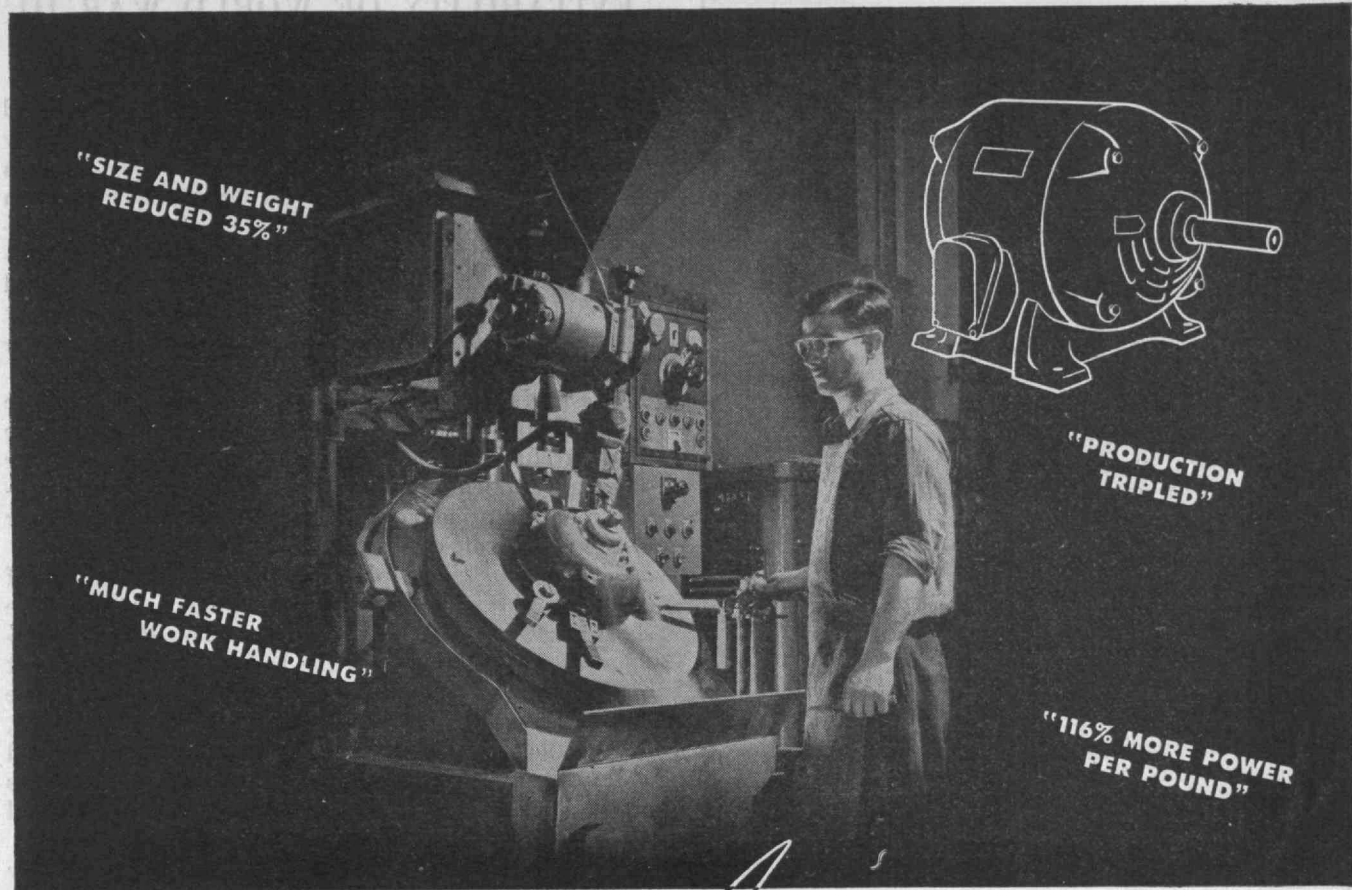
Russia is already following such a program as rapidly as her resources and rate of scientific progress will permit. Senator Vandenberg made the statement during the Senate debate on aid to Greece and Turkey that "we must choose the better calculated risk." The risk involved in military preparedness, in aid to Greece and Turkey, and in the rest of this short-range program in our world policy is far less than the risk of no action at all.

With these five weapons, the moral force of the United Nations, the Truman Doctrine, an intelligently planned and executed campaign to advertise the benefits of Western democracy, Three Power reconstruction of Europe, and a sound program of military preparedness, we can contain communism in its present boundaries and begin the gradual liberation of Soviet dominated areas in Europe and Asia.

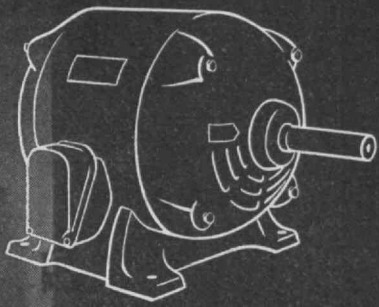
This is the short-range plan. There is no alternative, other than continued appeasement of Russia — leading in the end to the communist-controlled world that the Soviet leaders have planned.

There are two possible long-range plans that, if effected, could insure the peace of the world. The first plan might easily grow from the Truman Doctrine if that newly

(Concluded on page 228)



**"SIZE AND WEIGHT
REDUCED 35%"**



**"PRODUCTION
TRIPLED"**

**"MUCH FASTER
WORK HANDLING"**

**"116% MORE POWER
PER POUND"**

PRIZE TESTIMONIAL FOR

Automatic Welding

from our own production experience

INVESTIGATE!

Automatic welding is just one of many new or improved electrical techniques for producing faster, cheaper, better. Westinghouse engineers can quickly give you salient facts on others applicable to your industry, including the following:

- Induction Heating (metals)
- Dielectric Heating (non-metals)
- Infrared Drying
- Electric Furnace Brazing
- Resistance Welding

Write or phone your nearest Westinghouse office for details.

When we say automatic welding is better, faster, cheaper . . . we can prove it right in our own plants. Westinghouse not only makes automatic welding equipment, we're also one of its largest users.

At Buffalo, automatic welding permitted our designers to accomplish these outstanding results in producing the new LIFE-LINE motor: *size and weight reduced 35% . . . power capability increased 116% per pound . . . parts for complete line of NEMA motors reduced from 2,600 to 128 . . . production tripled.*

Once a setup is made, automatic welding becomes a "pushbutton" operation. Even with relatively unskilled labor, every weld is made perfectly. At last, welding approaches machine tool accuracy and speed of work handling.

Westinghouse is the *first* manufacturer to offer complete, "packaged" automatic welding equipment—built, sold and installed as a unit. A Westinghouse welding specialist is ready now to help you apply this improved metal-joining technique to your assembly problems.

J-85002



Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MORE PRODUCTIVE POWER FOR INDUSTRY





Reg. U. S. Pat. Off.

Samson Cordage Works

Boston 10, Mass.

Manufacturers of braided cords of all kinds, including sash cord, clothes line, trolley cord, signal cord, shade cord, Venetian blind cord, awning line, etc., also polished cotton twines and specialties.

SPOT CORD

Reg. U. S. Pat. Off.



Our extra quality sash cord, distinguished at a glance by our trade-mark, the colored spots. Especially well known as the most durable material for hanging windows, for which use it has been specified by architects for more than half a century.

EVITABILITY OF WORLD WAR III

(Concluded from page 226)

formed policy is not integrated into a carefully formulated world policy. That plan is the economic and military domination of the world by the United States. Such a policy is alien to our traditions and ideals. Such a program would justify Mr. Wallace's charge of "ruthless imperialism." The regimentation necessary to achieve economic and military hegemony over the world would inevitably result in dictatorship. It is inconceivable that a plan to establish a Pax American would obtain the support of Congress or of public opinion.

The alternative long-term plan is the domination of the world, not by one nation, but by a world government. The most carefully formulated and documented program for world government is the Federal Union plan. Some adaptation of that principle must certainly be the final answer to the world-wide cry for permanent peace.

The Federal Union plan has the great advantage of immediacy. It can be begun simultaneously with the short-range plan we have discussed. The British Commonwealth of Nations and the United States can put it into almost immediate operation. The adherence of the democracies and quasi-democracies of Western Europe, the Middle East, China, India, and Latin America would soon follow the demonstration of the economic advantages of the Union. Only Russia and Soviet surrounded, and Soviet controlled, nations would remain aloof.

Would the inception of such a Federal Union plan by Great Britain and the United States provoke the Soviet Union to war? Not if our short-range weapons of military preparedness and economic and military aid to the nations on the Soviet perimeter are functioning. Such a Federal Union would soon have so tremendous an economic and military potential that the only alternative to membership for Russia and the nations in her orbit would be economic isolation. Such isolation would mean the end of Soviet Five-Year Plans and the progress in industrialization so necessary if Russian living standards are to be raised. Control, even in a police state, becomes impossible if the people are hungry and hopeless. They have nothing to lose by revolt, and everything to gain. It would mean the end of the Politburo dictatorship.

These two constructive programs, the immediate and the continuing, integrated into a single, complete United States world policy, and made clear to the world, could achieve not only "peace in our time," but peace for generations. While our short-range policy plugs the dike against the flood of communist ideology and Soviet expansion, we have perhaps 10 years in which to work out a successfully functioning Federal Union. At the end of that time, if we have failed, then we have the choice of accepting a communist dominated world, or fighting a third world war.

Nicholas Murray Butler, in a brief article titled "The Crisis," concludes, "We have come to the time when, if liberty is to be preserved and extended, its upholders and defenders must be prepared to lead the way to the next stage of political organization. The world is waiting for a new application of the federal principle." The world crisis can only be resolved by a Federal Union uniting the world into a vast new nation "conceived in liberty, and dedicated to the proposition that all men are created equal."



WHERE SPECIALTY IS STANDARD

...In the design of all TIREX portable cords there is but one standard jacket—a special Selenium-Neoprene compound that's cured in lead.

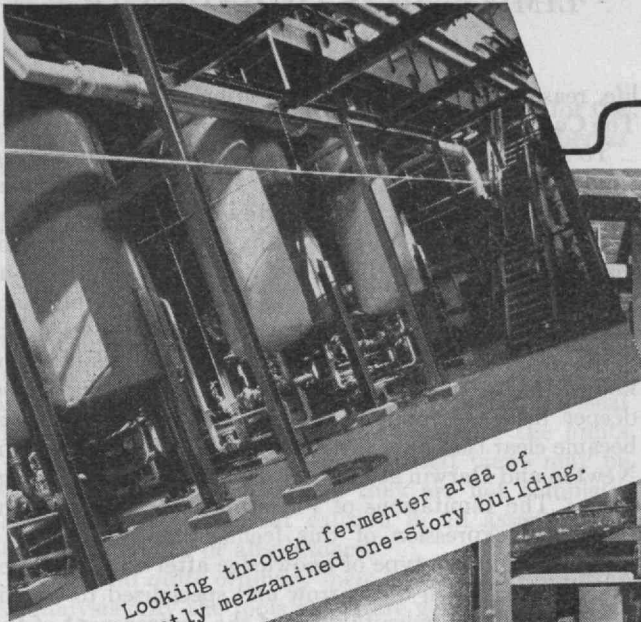
No other cord jacket provides more lasting protection against acids, oil, sunlight, flame and abrasion.

In the service of electrically-powered portable apparatus, TIREX cords with Selenium-Neoprene Armor are your assurance of dependable, trouble-free performance.

SIMPLEX WIRE & CABLE CO.


79 Sidney St., Cambridge 39, Mass.

Job #6210



Looking through fermenter area of partly mezzanined one-story building.

The case of
the plant that was



Looking along first-floor shipping department of five-story building.

BADGER-BUILT from the roof down

BADGER has process-engineered, designed, constructed and equipped hundreds of large-scale chemical, petroleum-refining and petrochemical plants or units "from the ground up."

This project was different.

Summoned to the task was Badger's diversified and cumulative experience with many products, many processes, and many kinds of equipment.

In co-operation with Eli Lilly and Company's research and engineering staffs, Badger took hold of a former war industries plant and converted it *from top to bottom* — designing and installing complete facilities for the efficient

manufacture, packaging and preservation of two of mankind's greatest lifesaving aids: *Streptomycin* and *Penicillin*.

The problems were vast... in the magnitude of the project; in the difficulties of fitting equipment into existing buildings; in the complexity of processing — extraction, distillation, filtration, concentration, sterilization, refrigeration, drying.

With immaculate interiors — even "color-engineered" for safety and avoiding employee fatigue — this "last word" in chemical plants is the proud possession of one of the world's foremost pharmaceutical houses.

E. B. Badger & SONS CO. Est. 1841 • BOSTON 14
New York • San Francisco • Los Angeles • London • Rio de Janeiro

PROCESS ENGINEERS AND CONSTRUCTORS FOR THE CHEMICAL, PETROLEUM AND PETRO-CHEMICAL INDUSTRIES

Memo

PURCHASING DEPT.

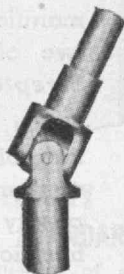
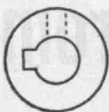
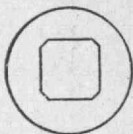
*More economical
to have Curtis machine
special universal joints
before assembly. Send
them our blueprints*

It saves man-hours and machine time to have joints shipped ready to install. Possible error or spoilage of joints in machining is eliminated.

Curtis can furnish forks to exact length required with hubs accurately turned, broached or bored for square, round, keyed or splined shafts. They have special jigs, equipment, and experienced craftsmen to do this work with the same precision and accuracy used in making standard Curtis Universal Joints.

Be sure to send Curtis blueprints and specifications with inquiry or order.

WRITE DEPT. B-5



LIMITATIONS OF TECHNIQUE

(Concluded from page 211)

life, reason has built and superstition destroyed . . .”⁴ The Cult of Science is the breeding ground of materialism.

To say that all science necessarily leads to materialism would be an unfair generalization. It is only when science is thought to contain the ultimate explanation of all the questions which trouble man that it is the source of materialism. When the first flash of scientific achievement was passed and men began to delve deeper into ultimate causes, they began to realize that sooner or later scientists must reach a point beyond which lies the infinite unknown. As the theories of Einstein and Heisenberg delved deeper into the fundamental facts of the universe, it became clear that all was not so simple as the followers of Newton and Darwin at first supposed. Sir Arthur Eddington's "The Limitations of Physical Science" is a scientist's own expression of this feeling. He writes, "We recognize that the type of knowledge after which physics is striving is much too narrow and specialized to constitute a complete understanding of the environment of the human spirit."⁵ Complete faith in the scientific interpretation of human experience represents an immature development in science. When I speak of the Cult of Science, I refer to that group which has not reached the maturity of thought demonstrated in "The Limitations of Physical Science."

Man's experience consists of two parts, the material and the spiritual. A materialistic philosophy, which is an attempt to reduce man's experience to the one material basis, is unsatisfactory because it is incomplete. The two aspects of experience should dovetail together, neither crowding out the other. The physical world is a part of our environment, and science or technique is the tool we use to shape that world according to our desires. But science looks only at the surface of things. It cannot get at the ultimate realities. When we know what the physical structure of the universe is from atom to sun, we will still ask, "What is it all about?" If we knew how to create a human organism by putting together the proper elements, we would still be unable to instill into it a moral consciousness, a sense of beauty, or any of the other attributes that make a man a man. If we try to analyze our religious experience with scientific principles, God is likely to become a mere personification of certain abstract principles. Beauty analyzed in a similar way becomes a compilation of data of physiological reactions. Is it sensible to eliminate them both for the sake of reason? "The truly human is found not in knowledge alone, but also in faith, in hope, in love, in pure-mindedness, in reverence, in the sense of beauty, in devoutness, in the thrill of awe, which Goethe says is the highest thing in man."⁶ To assume that nothing is true which cannot be depicted in the models of the engineer or the symbols of the mathematician is to miss the most satisfying part of human experience. Modern science has come to realize that there are definite limitations to technique. When the "scientists" among us who still want to reduce everything to physical reality come to this realization, they will have caught up with a science.

⁴ New York: J. B. Lippincott Company's *American Issues*, p. 808.

⁵ *New Pathways in Science* (New York: The Macmillan Company, 1935), p. 309.

⁶ Spalding, John Lancaster, *Means and Ends of Education* (New York: J. B. Lippincott Company's *American Issues*, p. 818.

**C CURTIS UNIVERSAL
JOINT CO. INC. SPRINGFIELD
MASS.**

PHYSICS IN THE CONTEMPORARY WORLD

(Continued from page 204)

will take care of it. The refinement of techniques for the prompt discovery of error serves as well as any other as a hallmark of what we mean by science.

In any case, it is an area of collective effort, in which there is a clear and well-defined community whose canons of taste and order simplify the life of the practitioner. It is a field in which the technique of experiment has given an almost perfect harmony to the balance between thought and action. In it we learn so frequently that we could almost become accustomed to it, how vast is the novelty of the world, and how much even the physical world transcends in delicacy and in balance the limits of man's prior imaginings. We learn that views may be useful and inspiring although they are not complete. We come to have a great caution in all assertions of totality, of finality or absoluteness.

In this field quite ordinary men, using what are in the last analysis only the tools which are generally available in our society, manage to unfold for themselves and all others who wish to learn, the rich story of one aspect of the physical world, and of man's experience. We learn to throw away those instruments of action and those modes of description which are not appropriate to the reality we are trying to discern, and in this most painful discipline, find ourselves modest before the world.

The question which is so much in our mind is whether a comparable experience, a comparable discipline, a comparable community of interest, can in any way be

available to mankind at large. I suppose that all the professional scientists together number some one one-hundredth of a per cent of the men of the world; even this will define rather generously what we mean by scientists. Scientists as professionals are, I suppose, rather sure to constitute a small part of our people.

Clearly, if we raise at all this question which I have raised, it must be in the hope that there are other areas of human experience that may be discovered or invented or cultivated, and to which the qualities which distinguish scientific life may be congenial and appropriate. It is natural that serious scientists, knowing of their own experience something of the quality of their profession, should just today be concerned about its possible extension. For it is a time when the destruction and the evil of the last quarter century make men everywhere eager to seek all that can contribute to their intellectual life, some of the order and freedom and purpose which we conceive the great days of the past to have. Of all intellectual activity, science alone has flourished in the last centuries, science alone has turned out to have the kind of universality among men which the times require. I shall be disputed in this; but it is near to truth.

If one looks at past history, one may derive some encouragement for the hope that science, as one of the forms of reason, will nourish all of its forms. One may note how integral the love and cultivation of science was with the whole awakening of the human spirit which characterized the Renaissance. Or one may look at the late Seventeenth and Eighteenth Centuries in France and England, and see what pleasure and what stimulation

(Continued on page 232)

A Threefold Service to Tool Engineers

SIZE CONTROL CO.

2528 Washington Blvd., Chicago 12, Illinois
Phone: Monroe 6710

Originators of REVERSIBLE THREAD GAGES that combine maximum economy with precision. Still in service are Size Control reversible plug gages that have been ground back three times on leading edge at both ends ... six gages in one at no extra cost!

REVERSIBLE PLUG GAGES (Pat. appl. for)



Threaded



Plain

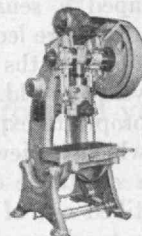
Plug Gages Plain Reversible	Ring Gages Plain Ring	Measuring Wires
Thread Reversible	Thread Ring	Thread Wires
Taper-Flat-Special	Taper-Specials	Special Wires

Tool Steel - Chrome - Tungsten Carbide - Stellite - Sapphire - Gage Sets
Drill Sets - Number Sets - Fractional Sets - Dowel Pins - Centerless, Thread, Cylindrical Grinding.

WALSH PRESS & DIE CO.

4755 W. Kinzie St., Chicago 44, Illinois
Phone: Esterbrook 6700

HIGH PRODUCTION INCLINABLE PUNCH PRESSES
6 to 80 tons capacity



With



WALSH POWER PRESS SAFETY DEVICE with non-repeating attachment... saves fingers and hands ... can be fitted to any make of power press ... simple, foolproof.

PUNCH PRESSES - KICK PRESSES
- DEEP DRAW PRESSES - SAFETY DEVICES - STOCK REELS

WACKER SALES DIVISION

35 E. Wacker Dr., Chicago 1, Illinois
Phone: Central 0375

Complete Gaging Source in
ILLINOIS - WISCONSIN - IOWA
area for

B. C. Ames Co.
Dial Indicators, Gages

Brush Development Co.
Surface Analyzers, Oscillographs

Riehle
Material Testing Equipment

Webber
Gage and Angle Blocks

Gem
Toolmaker's Indicators

Ferriot Bros.
Air Tools, Rotary Files

Waltham
Spline Gages, Master Gears

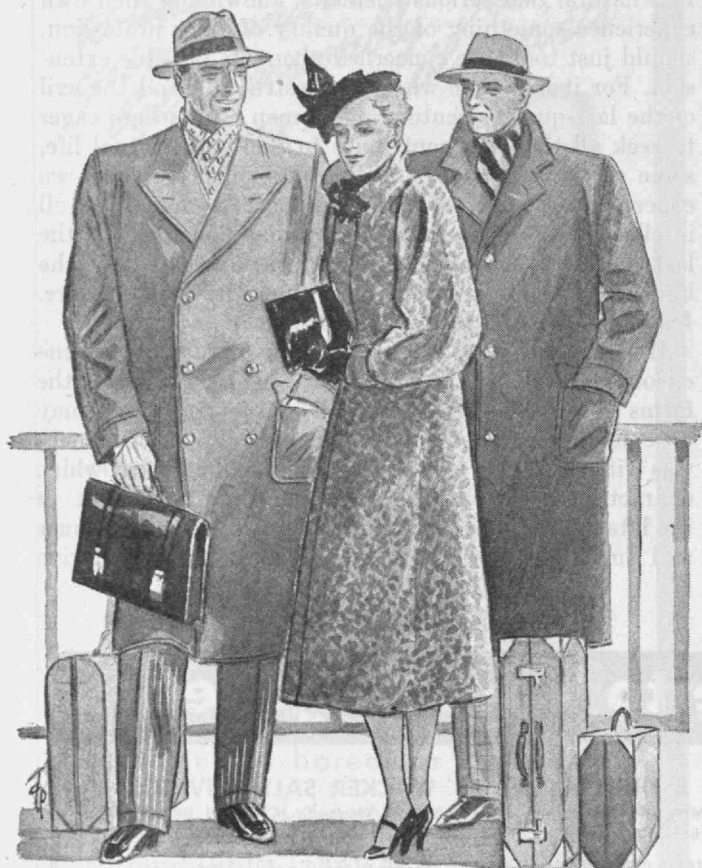
Suman
Snap Gages

D I V I S I O N S O F

AMERICAN GAGE & MACHINE CO.

Engineering Representatives in Principal Cities

Get to know the modern Rogers Peet!



Critical eyes approve

Clothes by the *modern Rogers Peet* express the style and taste of a well-dressed man. Critical eyes approve.

Finest imported and domestic fabrics. Our own careful, unhurried tailoring and fitting.

Get to know the *modern Rogers Peet*!

Styles for young men, and men who never grow old.

Rogers Peet
Company

Makers of Fine Clothes

In New York:
Fifth Avenue
at 41st Street

Thirteenth St.
at Broadway

Warren Street
at Broadway

And in Boston:
Tremont St.
at Bromfield St.

PHYSICS IN THE CONTEMPORARY WORLD

(Continued from page 231)

the men of that time derived from the growth of physics, astronomy, and mathematics.

What perhaps characterizes these periods of the past, which we must be careful not to make more heroic because of their remoteness, was that there were many men who were able to combine in their own lives the activities of a scientist with activities of art and learning and politics, and were able to carry over from the one into the others this combination of courage and modesty which is the lesson that science always tries to teach to anyone who practices it.

And here we come to a point we touched earlier. It is very different to hear the results of science, as they may be descriptively or even analytically taught in a class or in a book or in the popular talk of the time; it is very different to hear these and to participate even in a modest way in the actual attainment of new knowledge. For it is just characteristic of all work in scientific fields that there is no authority to whom to refer, no one to give canon, no one to blame if the picture does not make sense.

Clearly these circumstances pose a question of great difficulty in the field of education. For if there is any truth in the views that I have outlined, there is all the difference in the world between hearing about science or its results, and sharing in the experience of the scientist himself and of that of the scientific community. We all know that an awareness of this, and an awareness of the value of science as method, rather than science as doctrine, underlies the practices of teaching to scientist and layman alike. For surely the whole notion of incorporating a laboratory in a high school or college is a deference to the belief that not only what the scientist finds, but how he finds it, is worth learning and teaching and worth living through.

Yet there is something fake about all this. No one who has had to do with elementary instruction can have escaped a sense of artificiality in the way in which students are led, by the calculations of their instructors, to follow paths which will tell them something about the physical world. Precisely that groping for what is the appropriate experiment, what are the appropriate terms in which to view subtle or complex phenomena, which are the substance of scientific effort, almost inevitably are distilled out of it by the natural patterns of pedagogy. The teaching of science to laymen is not wholly a loss; and here perhaps physics is a typically bad example. But surely they are rare men who, entering upon a life in which science plays no direct part, remember from their early courses in physics what science is like or what it is good for. The teaching of science is at its best when it is most like an apprenticeship.

James B. Conant, President of Harvard University, in his sensitive and thoughtful book, *On Understanding Science*,* has spoken at length of these matters. He is aware of how false it is to separate scientific theory from the groping, fumbling, tentative efforts which lead to it. He is aware that it is science as method and not as doctrine which we should try to teach. His basic sugges-

(Continued on page 234)

* New Haven, Conn.: Yale University Press, 1947. \$2.00.

Safekeeping and Accounting Services for Individuals, Trustees, and Treasurers



Persons who have the responsibility of caring for investments, whether for themselves, as Trustees, or as Treasurers of Institutions, find our Bookkeeping Agency Service useful in handling the detailed work.

A Bookkeeping Agency provides:

1. Safekeeping of securities;
2. Collection and remittance of income;
3. Execution of purchases and sales as directed;
4. Complete Accounting;
5. Preparation of income tax data.

In addition to these services, under an Advisory Agency, we will advise you concerning the investments in the accounts for which you are responsible.

We shall be glad to send you more details upon request.

The New England Trust Company

135 DEVONSHIRE STREET

At the Corner of Milk Street

BACK BAY BRANCH : : 99 NEWBURY STREET

BOSTON, MASS.

Member Federal Reserve System

PHYSICS IN THE CONTEMPORARY WORLD

(Continued from page 232)

tion is that we attempt to find, in the history of our sciences, stories which can be recreated in the instruction and experiment of the student, and which thus can enable him to see at first hand how error may give way to less error, confusion to less confusion, and bewilderment to insight.

The problem that President Conant has here presented is indeed a deep one. Yet he would be quite willing, I think, that I express skepticism that one can recreate the experience of science as an artifact. And he would no doubt share my concern that science so taught would be corrupt with antiquarianism. It was not antiquarianism, but a driving curiosity, that inspired in the men of the Renaissance their deep interest in classical culture.

For it is in fact difficult, almost to the point of impossibility, to recreate the climate of opinion in which substantial errors about the physical world, now no longer entertained, were not only held but were held unquestioned as part of the obvious mode of thinking about reality. It is most difficult to do because in all human thought only the tiniest fraction of our experience is in focus, and because to this focus a whole vast unanalyzed account of experience must be brought to bear. Thus I am inclined to think that with exceptions that I hope will be many, but fear will be few, the attempt to give the history of science as a living history will be far more difficult either than to tell of the knowledge that we hold today, or to write externally of that history

as it may appear in the learned books. It could easily lead to a sort of exercise of mental inventiveness on the part of teachers and students alike which is the very opposite of the candor, the "no-holds-barred" rules of Professor Bridgman, that characterize scientific understanding at its best.

If I am troubled by President Conant's suggestions, this is not at all because I doubt that the suggestions he makes are desirable. I do have a deep doubt as to the extent to which they may be practical. There is something irreversible about acquiring knowledge; and the simulation of the search for it differs in a most profound way from the reality. In fact, it would seem that only those who had some firsthand experience in the acquisition of new knowledge in some disciplined field would be able truly to appreciate how great the science of the past has been, and would be able to measure those giant accomplishments against their own efforts to penetrate a few millimeters further into the darkness that surrounds them.

Thus it would seem at least doubtful that the spiritual fruits of science could be made generally available, either by the communication of its results, or by the study of its history, or by the necessarily somewhat artificial re-enactment of its procedures. Rather it would seem that there are general features of the scientists' work the direct experience of which in any context could contribute more to this end. All of us, I suppose, would list such features and find it hard to define the words which we found it necessary to use in our lists. But on a few, a common experience may enable us to talk in concert.

(Continued on page 236)



Boit, Dalton & Church

INSURANCE SINCE 1865

89 BROAD STREET, BOSTON 10 • Telephone HUBbard 2-3100

FREDERIC C. CHURCH

CHAS. COLBY HEWITT

JOHN W. GAHAN

FREDERICK G. FARQUHAR

COLLINS GRAHAM

STANLEY H. KING

HAROLD J. RYAN, INC.

Air Conditioning

101 PARK AVENUE

NEW YORK 17, N. Y.

ATLANTA
BALTIMORE
BIRMINGHAM
BUFFALO
CHICAGO
CINCINNATI
CLEVELAND
COLUMBUS
DALLAS
DAYTON
DENVER
DETROIT
HARTFORD
HOUSTON
INDIANAPOLIS
KANSAS CITY
LAWRENCEVILLE, N.J.
LOUISVILLE
NEW HAVEN
NEW ORLEANS
NORFOLK
OMAHA
PHILADELPHIA
PITTSBURGH
POTTSTOWN, PA.
PRINCETON
PROVIDENCE
RICHMOND, VA.
ROCHESTER
ST. LOUIS
SOUTHBORO, MASS.
SYRACUSE
TOLEDO
TULSA
UTICA
WASHINGTON, D.C.

BROOKS BROTHERS' Travelling Representatives will visit 36 places in February and March with comprehensive assortments of our celebrated Ready-Made Clothes and Furnishings. If you live in or near one of the cities listed...and are interested in inspecting our local showing or ordering anything from our representatives...write for a copy of our Spring Itinerary, showing exactly where and when our representatives will be in your city.

ESTABLISHED 1818

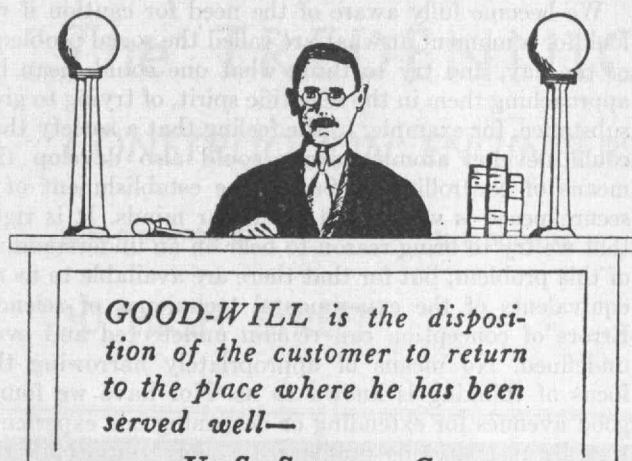
Brooks Brothers,
CLOTHING,
Mens Furnishings, Hats & Shoes

346 MADISON AVENUE, COR. 44TH ST., NEW YORK 17, N. Y.

46 NEWBURY, COR. BERKELEY STREET, BOSTON 16, MASS.

LOS ANGELES • SAN FRANCISCO

THE TRIAL IS NEVER OVER



U. S. Supreme Court.
TO OUR FRIENDS

We do not believe that any advertising copy man could have penned a neater and more trenchant definition than this decision of the Supreme Court.

It happens also to be the verdict which our customers have reached regarding their relations with us.

Your specific problems in technical reproduction work from the lowly blue print to the complicated offset printing of an engineering manual, will find their happy solution with us.

ELECTRO SUN COMPANY, INC.

Blue Prints — Photo Prints — Photo Offset

161 Washington Street 157 Chambers Street
Grand Central Terminal Building
NEW YORK, N. Y.

A. L. Weil '01

J. C. Duff '86

TECHNOLOGY MEN . . .

CAMPUS ROOM

The Graduate House

Technology's Social Center

is the

**HOME FOR YOUR
CLASS FUNCTIONS**

20

MENUS SUBMITTED ON REQUEST

20

Address: H. K. DOW

**THE GRADUATE HOUSE
M. I. T.**

Cambridge 38, Massachusetts

Tel. Kirkland 2680

WILLIAM D. NEUBERG CO., INC.

Chemicals

GRAYBAR BUILDING 420 LEXINGTON AVE.

NEW YORK 17, N. Y.

TELEPHONE LEXINGTON 2-3324

CABLE—"WILNEUBERG"

J. C. CORRIGAN CO., INC.

Conveyers

Engineers • Manufacturers • Erectors

Coal Handling Systems

Materials Handling Equipment

Portable Conveyors

Distributors for

Jeffrey Manufacturing Co.

Jeffrey Parts Carried in Boston Stock

41 Norwood Street, Boston 22, Mass.

Tel. GENEva 0800



Transits and Levels are used on all largest works and by U. S. Govt. for utmost precision. Rental Insts. New catalog, just issued, sent gratis. A souvenir plumb-bob sent for 3¢ postage.

BUFF & BUFF CO. Boston 30, Mass.

Henry A. Buff '05

William H. Coburn, '11

William F. Dean, '17

William H. Coburn & Co.

INVESTMENT COUNSEL

68 Devonshire St.

Boston, Mass.



**PRECISION-GAUGED
HAIRSPRINGS
AND
FINE ROLLED WIRE**

PRECISION PRODUCTS COMPANY

WALTHAM, MASSACHUSETTS

ROBERT I. BRADLEY '20

PHYSICS IN THE CONTEMPORARY WORLD

(Continued from page 234)

In the first instance the work of science is co-operative; a scientist takes his colleagues as judges, competitors and collaborators. That does not mean, of course, that he loves his colleagues; but it gives him a way of living with them which would be not without its use in the contemporary world. The work of science is disciplined, in that its essential inventiveness is most of all dedicated to means for promptly revealing error. One may think of the rigors of mathematics, and the virtuosity of physical experiment as two examples. Science is disciplined in its rejection of questions that cannot be answered, and in its grinding pursuit of methods for answering all that can. Science is always limited, and is in a profound sense unmetaphysical, in that it necessarily bases itself upon the broad ground of common human experience, tries to refine it within narrow areas where progress seems possible and exploration fruitful. Science is novelty, and change. When it closes it dies. . . . These qualities constitute a way of life which of course does not make wise men from foolish, or good men from wicked, but which has its beauty and which seems singularly suited to man's estate on earth.

If there is to be any advocacy at all in this talk it would be this: that we be very sensitive to all new possibilities of extending the techniques and the patterns of science into other areas of human experience. Even in saying this we must be aware how slow the past development of science has in fact been, how much error there has been, and how much in it that turned out to be contrary to intellectual health or honesty.

We become fully aware of the need for caution if we look for a moment at what are called the social problems of the day, and try to think what one could mean by approaching them in the scientific spirit, of trying to give substance, for example, to the feeling that a society that could develop atomic energy could also develop the means of controlling it. Surely the establishment of a secure peace is very much in all our minds. It is right that we try to bring reason to bear on an understanding of this problem; but for that there are available to us no equivalents of the experimental techniques of science. Errors of conception can remain undetected and even undefined. No means of appropriately narrowing the focus of thinking is known to us. Nor have we found good avenues for extending or deepening our experience that bears upon this problem. In short, almost all the preconditions of scientific activity are missing, and in

(Concluded on page 238)

SWISS AUTOMATICS

Rebuilding and Tooling Service

We have trained personnel and facilities for complete rebuilding and tooling of your Swiss Automatics and other type Swiss Machines.

YOUR INQUIRIES ARE INVITED

BORIS M. VOLYNSKY MFG. CO., INC.

311 West 66th Street

New York 23, N. Y.

McCREERY and THERIAULT

Building Construction

126 NEWBURY STREET

BOSTON, MASS.

Lord Electric Company

INCORPORATED

ELECTRICAL CONSTRUCTION

131 Clarendon Street
Boston 16, Massachusetts
Telephone CO 6-0456

10 Rockefeller Plaza
New York 20, N. Y.
Telephone CI 6-8000

1201 Plaza Building
Pittsburgh 19, Pa.
Telephone COURT 1920

The TREDENNICK-BILLINGS CO.

CONSTRUCTION ENGINEERS * BUILDING CONSTRUCTION

K. W. RICHARDS '07

H. D. BILLINGS '10

C. C. JONES '12

F. J. CONTI '34

10 HIGH STREET

*

BOSTON, MASSACHUSETTS

FOR IMMEDIATE DELIVERY
Odd and Large Sizes a Specialty
 $\frac{1}{8}$ " to 72"

**LARGEST AND
MOST COMPLETE STOCK
on Atlantic Seaboard**

Our Own Shop Facilities for
Bending — Coiling — Welding —
Threading and Testing —

Meeting All Standard Specifications
TUBE-TURNS, WELDING FITTINGS AND FLANGES

If It's Made — Ask ALBERT!

• PIPE

Electric Weld
Seamless
Spiral Weld
Lap Weld
Butt Weld
Steel—Wrought Iron
Corrugated Culvert

• VALVES

Iron Body
Forged Steel
Cast Steel
and
Special
Alloys

• FITTINGS

Welding
Tube Turns
Fabricated
Cast Iron
Forged Steel
Dresser
Victaulic

• PILING

ARMCO
Youngstown
Pile Points
Cobi-Pile Tips
Pile Sleeves
Cobi-Timber Tips

STAINLESS STEEL PIPE, FITTINGS AND VALVES

S. G. ALBERT '29, Treasurer

ALBERT PIPE SUPPLY CO., Inc.

No. 13th & Berry Streets, Brooklyn, N. Y. EVergreen 7-8100

EDGERTON, GERMESHAUSEN & GRIER, Inc.

Consulting Engineers

Research, Development and Manufacture
of Electronic and Stroboscopic Equipment

Specialists in High-Speed Photography

155 Massachusetts Avenue, Cambridge 39, Mass.

LEONARD CONSTRUCTION COMPANY

Engineers and Contractors

SINCE 1905

IN ALL THE AMERICAS AND FAR EAST

37 South Wabash Ave.
Chicago

420 Lexington Ave.
New York City

MONSANTO CHEMICAL COMPANY

Merrimac Division

EVERETT
MASSACHUSETTS

*The largest and oldest
chemical manufacturer in New England*

SYSKA & HENNESSY, Inc.

Engineers

Consultation

Plans

Reports

Power Plant

Disposal Plants

Water Systems

NEW YORK, N. Y.

J. F. HENNESSY '24

PHYSICS IN THE CONTEMPORARY WORLD

(Concluded from page 236)

this case, at least, one may have a melancholy certainty that man's inventiveness will not rapidly provide them. All that we have from science in facing such great questions is a memory of our professional life, which makes us somewhat skeptical of other people's assertions, somewhat critical of enthusiasms so difficult to define and to control.

Yet the past century has seen many valid and inspiring examples for the extension of science to new domains. As even in the case of physics, the initial steps are always controversial; probably we should not as a group be unanimous in saying which of these extensions were hopeful, and which not, for the science of the future. But one feature which I cannot fail to regard as sound, particularly in the fields of biology and psychology, is that they provide an appropriate means of correlating understanding and action, and involve new experimental procedures in terms of which a new conceptual apparatus can be defined; above all, they give us means of detecting error. In fact, one of the features which must arouse our suspicion of the dogmas some of Freud's followers have built up on the initial brilliant works of Freud, is the tendency towards a self-sealing system, a system, that is, which has a way of almost automatically discounting evidence which might bear adversely on the doctrine. The whole point of science is to do just the opposite: to invite the detection of error and to welcome it. Some of you may think that in another field a comparable system has been developed by the recent followers of Marx.

Thus we may hope for an ever widening and more diverse field of application of science. But we must be aware how slowly these things develop, and how little their development is responsive to even the most desperate of man's needs. For me it is an open question, and yet not a trivial one, whether in a time necessarily limited by the threats of war and of chaos, these expanding areas in which the scientific spirit can flourish may yet contribute in a decisive way to man's rational life.

I have had to leave this essential question unanswered: I am not at all proud of that. In lieu of apology perhaps I may tell a story of another lecturer, speaking at Harvard, a few miles from here, two decades ago. Bertrand Russell had given a talk on the then new quantum mechanics, of whose wonders he was most appreciative. He spoke hard and earnestly in the New Lecture Hall. And when he was done, Professor Whitehead, who presided, thanked him for his efforts, and not least for "leaving the vast darkness of the subject unobscured."

PREPARATORY SCHOOLS FOR BOYS

CHAUNCY HALL SCHOOL

Founded 1828. The School that confines itself exclusively to the preparation of students for the Massachusetts Institute of Technology.

FRANKLIN T. KURT, Principal

553 Boylston Street, Boston, Mass.

HUNTINGTON SCHOOL FOR BOYS

Grades Nine to Twelve.

Thorough preparation for entrance to M.I.T.

and other technical schools.

Regular and summer courses.

320 Huntington Ave., Boston

Tel. Kenmore 1800

PROFESSIONAL CARDS

JACKSON & MORELAND

Engineers and Consultants

Design and Supervision of Construction
Reports — Examinations — Appraisals
Machine Design — Technical Publications

BOSTON

NEW YORK

H. K. BARROWS, '95

M. Am. Soc. C. E.

CONSULTING HYDRAULIC ENGINEER

*Hydro-electric Developments — Water Supplies. Reports, Plans,
Supervision. Advice, Appraisals*

6 BEACON STREET

BOSTON, MASS.

EADIE, FREUND AND CAMPBELL

CONSULTING ENGINEERS

500 FIFTH AVENUE

NEW YORK 18, N. Y.

*Plans and Specifications — Examinations and Reports
Power, Heating, Ventilating, Electric, Plumbing,
Sprinkler, Refrigerating, Elevator Installations, etc.,
in Buildings and Industrial Plants*

J. K. CAMPBELL, M. I. T. '11

STARKWEATHER ENGINEERING CO.

INCORPORATED

*Engineers and Contractors for Pumping Plants
Boiler and Power Plants, Cooling Water
and Heat Recovery Systems*

246 Walnut Street, Newtonville

BIGelow 8042

Wm. G. Starkweather, M.E.
Cornell '92

J. B. Starkweather, B.S.
M.I.T. '21

THE KULJIAN CORPORATION

CONSULTANTS • ENGINEERS • CONSTRUCTORS

Specialists in

UTILITY, INDUSTRIAL and CHEMICAL FIELDS

1518 WALNUT STREET

PHILADELPHIA, PA.

H. A. KULJIAN '19

FABRIC RESEARCH LABORATORIES

INCORPORATED

*Research, Development and Consultation
for Textile and Allied Industries*

665 Boylston Street

Boston, Mass.

W. J. HAMBURGER, '21 K. R. Fox, '40 E. R. KASWELL, '39

GILBERT ASSOCIATES, INC.

ENGINEERS AND CONSULTANTS

Malcolm G. Davis '25, *Vice President* Allen W. Reid '12 E. C. Edgar '35
Steam, Hydro, Diesel Power Plants; Industrial Structures;
Plant Safety, Labor Relations, Utility Rates, Valuations,
Reports; Large Scale Purchasing; Industrial Laboratory

New York, N. Y.
Reading, Pa.

Washington, D. C.
Philadelphia, Pa.

FAY, SPOFFORD & THORNDIKE

Engineers

Airports — Bridges — Water Supply and Sewerage
Port and Terminal Works — Fire Prevention

INVESTIGATIONS

DESIGNS

SUPERVISION OF CONSTRUCTION

BOSTON

NEW YORK

WALLACE CLARK & COMPANY

CONSULTING MANAGEMENT ENGINEERS

Since 1920

Planning for Research and Development, Engineering,
Production, Quality Control, Maintenance, Surveys,
Industrial Relations, Sales, Management Audits.

521 FIFTH AVENUE

NEW YORK 17, N. Y.

MAURICE A. REIDY

Consulting Engineer

BRIDGES

STRUCTURAL DESIGNS

CONSTRUCTION CONSULTANT AND ARCHITECTURAL ENGINEER

Estimates and Appraisals

101 TREMONT STREET

BOSTON, MASS.

THE COSMA LABORATORIES CO.

1545 East 18th Street

Cleveland 14, Ohio

Chemical Analysis — Testing — Consulting Engineering
Testimony and Research

H. SEYMOUR COLTON, M.I.T. '21
Director

R. W. FRISCHMUTH, Case '38
Assistant Director

MORAN, PROCTOR, FREEMAN & MUESER

CONSULTING ENGINEERS

420 LEXINGTON AVENUE

NEW YORK 17, N. Y.

Foundations for Buildings, Bridges and Dams;
Tunnels, Bulkheads, Marine Structures, Soil Studies and Tests;
Reports, Design and Supervision

Pardo, Proctor, Freeman & Mueser
Ingenieros Consultores
Ap. Correos 614, Caracas, Venezuela

WILLIAM H. MUESER, '22
GEORGE T. GILMAN, '23

PALMER RUSSELL CO.

Realtors

Real Estate Brokers

Property Management

Appraisals and Mortgages

1320 BEACON STREET

BROOKLINE, MASS.

Edgar P. Palmer '25

William W. Russell '22

FAirmount 5105

EXpress 7766

FRANK MASSA

Electro-Acoustic Consultants

3393 Dellwood Road

CLEVELAND, OHIO

3868 Carnegie Avenue

22 MILLION VOLT X-RAYS...



TO LOOK INTO STEEL — AND YOUR FUTURE!

Developing high-voltage betatrons that look deep into steel for hidden flaws . . . turbines that utilize the tornado force of expanding gases . . . induction heaters and other electronic equipment . . . this is challenging work of absorbing interest. This is the work of Allis-Chalmers.

Power generation, mining, processing, hydraulics—A-C's wide diversity in *all* fields offers young engineers unmatched opportunities to develop special talents, achieve success!



INVESTIGATE

ALLIS-CHALMERS

ONE OF THE BIG 3 IN ELECTRIC POWER EQUIPMENT—
BIGGEST OF ALL IN RANGE OF INDUSTRIAL PRODUCTS!

Write for Book No. 6085,
outlining A-C's Graduate
Training Course.

Allis-Chalmers Mfg. Co.,
Milwaukee 1, Wisconsin

TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND — ITS PROBLEMS AND GROWTH

Seven-Year Leaders

Every now and then it's fun to look back over the record to pick out "significant" figures. And sometimes they actually prove something. We've been doing that recently, and among the interesting results were several columns showing the relative performance of the classes during the seven-year life of the Fund. Of course for purposes of detailed analysis, they need a lot of explaining and weighting and all that sort of thing, but as one indication of what has been done they are worth examining.

The logical basis for comparison is achievement of quotas. These quotas are: for contributors, one-third of the active class roll; for amount, this number multiplied by a sliding-scale amount. And here is the line-up of the ten leading classes in each category:

Average Annual Per Cent of Quota During Seven-Year Life of Fund

<i>Contributors</i>		<i>Amount</i>	
<i>Class</i>	<i>Per Cent</i>	<i>Class</i>	<i>Per Cent</i>
1. 1891.....	133	1. 1905.....	205
2. 1893.....	124	2. 1896.....	147
3. 1896.....	120	3. 1894.....	126
4. 1911.....	116	4. 1911.....	120
5. 1894.....	115	5. 1897.....	119
6. 1902.....	101	6. 1893.....	111
7. 1913.....	100	7. 1907.....	101
8. 1909.....	97	8. 1915.....	92
9. 1912.....	97	9. 1899.....	89
10. 1901.....	96	10. 1900.....	86

And which class has the best all-round performance? On the basis of these figures alone, it looks like '96, which placed second on one score, third on the other. There are only three other classes which made both lists. They seem to be in a three-way tie. The Class of 1911 took two fourth places; 1893 has a two and a six; and 1894, a three and five.

To these classes, all honor for the leadership which they have shown. To all classes, congratulations for the way in which, in seven years, they have made their Alumni Fund a vital part of Institute financing, a stabilizing influence at a time when stability is greatly needed.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Washington Society of the M.I.T.

The December dinner meeting, the best attended of 1947, was held at the Young Woman's Christian Association on December 11. President Beitzell '28 and Bob Thulman '22 presented Captain Robert S. Quackenbush, Jr., U.S.N., who brought us up to date on "Operation High Jump."

The Navy's recent Antarctic venture has been reported completely in books, magazines, and movies. The speaker spotlighted little-understood features and spared no pains to show how basically difficult this expedition proved to be. Ice—ice—ice. Antarctica is surrounded with a shelf of floating ice which bars access to the huge land mass beyond. Nowhere can a ship approach land nearer than 250 miles. The floating ice from this point, 1,000 feet thick, is as firm as land itself, although moving a quarter of a mile a year. Less impenetrable forms of ice extend hundreds of miles from the permanent shelf. Pack ice may be in fields a hundred miles square and 20 feet thick. Bergs, bergy bits, growlers, and slush ice met the naval task force 700 miles before it reached Little America.

Excellent descriptions by the Captain, supplemented by movies, told of helicopters scouting best paths through the ice. Ice-breakers crashed their way as directed by helicopters. Vessels with men and supplies followed close astern of the icebreaker. After 15 days of fighting ice the force reached the Bay of Whales. This curious floating harbor remains unchanged year after year. A deep dent in the high coastal ice barrier makes a bay where 10-foot pack ice permits vessels to come alongside and unload. Supplies, once on the ice, had to be moved several miles inland quickly lest fields of the ice should break off, carrying supplies out to sea.

Engineering against ice is not a fully developed field. "High Jump" shot six-inch high explosive shells at bergs—"Didn't knock off enough ice to mix a drink," said Captain Quackenbush. When ships were stuck too tightly for an icebreaker to free, T.N.T., dynamite, and other explosives released them only after days of work. A careful watch on ocean temperature was kept continually. When the temperature dropped to 29½ degrees, freezing began, and the ships pulled out to keep from being frozen in.

The icebreaker, 6,000 tons and 18,000 horsepower, is the one really effective way to cope with ice. This vessel charges along at 15 knots, crashing into the pack. Sheer irresistible impact plus a certain overriding action breaks the ice to let the ship pass. When hard pressed, the breaker can rock itself by shifting water ballast quickly from side to side. If there is open water near by, the breaker can smash through ice 20 feet thick. On the other hand, a hugh field of ice only six feet thick might stop the vessel.

Properly re-enforced, ice is hard to break.

Captain Quackenbush clarified the difference between the Arctic and Antarctic regions. As he has spent time in both during the past 12 months, his impressions are recent. The Arctic has life, in the Eskimos, bears, rabbits, foxes, seals, and birds. The South Pole, conversely, has absolutely no life, save for certain lichens seen on rock. Distant from the South Pole and along the edge of the ice is the only life in Antarctica—penguins, seals, and whales. It is a bleak place indeed. South Polar temperatures are lower than Arctic counterparts, too. On February 6, 1947, Little America was 20 degrees below zero. On the following August 6, the corresponding warm day at the North Pole, the air in the Arctic near the North Pole was 57 degrees above zero. Because of this formidable ice-cap and the tremendous distances from markets, commercial development will be slow in South Polar regions.

Present were: 1889: G. W. Stone; 1890: J. G. Crane; 1893: G. W. Stose; 1897: P. L. Dougherty, F. A. Hunnewell; 1900: H. C. Morris; 1901: Charles Bittinger; 1902: G. E. Marsh; 1903: W. L. Cook; 1904: A. M. Holcombe, F. W. Milliken, G. N. Wheat; 1905: J. A. Furer, E. F. Kriegsmann, O. C. Merrill; 1907: W. H. Martin; 1909: E. D. Merrill; 1910: J. H. Ruckman; 1912: D. J. Guy, A. M. Pedersen, G. A. Robinson; 1915: A. D. Beidelman; 1916: F. P. Upton, W. E. Wentworth; 1918: H. D. Manuelian; 1919: L. J. Grayson; 1921: Richard McKay, R. W. Smith, P. R. Taylor; 1922: R. J. Hogan, R. K. Thulman; 1923: L. K. Downing, H. M. Wade; 1924: R. E. Dorr, J. E. Jackson, G. M. Tapley; 1926: S. J. Cole, A. S. Heyser; 1928: A. E. Beitzell, G. D. Mock; 1929: A. J. Perry, J. A. Plugge, N. P. Stathis; 1930: A. F. Bird, N. C. Nelson, W. E. Yelland, C. H. Small; 1931: I. W. Finberg, W. B. Stewart; 1932: W. S. Clark, F. M. Moss; 1933: M. E. Gardner; 1934: K. H. Lippitt; 1936: E. R. Pettebone; 1937: R. E. Black; 1939: H. G. Fletcher, Jr.; 1940: M. E. Greenspon; 1941: S. H. Ivison, Jr., E. F. Lawrence, F. W. Phillips; 1943: M. E. Brown, J. U. Jovellanos; 1945: R. L. Neyman, F. S. Pohanka, Jr., A. E. Simon, Jr.; 1947: P. L. Quattrochi, T. C. Warner, Jr.—JOHN A. PLUGGE '29, Secretary, 35 Oxford Street, Chevy Chase, Md. ALBERT F. BIRD '30, Review Secretary, 5070 Temple Hills Road, Southeast, Washington 20, D. C.

M.I.T. Club of Southern California

At this writing, in early December, we are expecting to have Mr. Lobdell '17 with us for a dinner meeting at 7:00 P.M., on Friday, January 16, at the Rodger Young Auditorium, 936 West Washington Boulevard, Los Angeles 15, Calif.

On Monday, November 17, we met for dinner at Eaton's Rancho in North Hollywood. Guests for the evening were Louis C. McCabe, chief engineer and director of

the Office of Air Pollution Control for the County of Los Angeles, and General Amos Thomas, Executive Secretary of the Citizens Smog Advisory Committee. The meeting was considered a success by those attending, who numbered 53. At these meetings we usually have a few people who have never been to a local meeting and a few who have not been for years. About one-third of the attendance repeats every time, and the other two-thirds are different. If we ever have a meeting to which all members come at the same time, there will be quite a crowd.

The subject on November 17 was the "Smog" or air pollution problem facing Los Angeles at this time. This region is chronically subject to temperature inversion, a condition in which layers of cold air hold down other layers of air over the sector in such fashion that there is no mixing of air between the layers. Consequently, smoke from the city disperses into the blanket of air at the ground level without rising into the layers above. The general effect is that of a small room full of cigar smokers, or the Boston Garden on a busy night. The resultant lack of visibility is not so bad as the strong fumes, which cause very noticeable smarting of the eyes and other physical discomforts.

The office of air pollution control is new here, and Dr. McCabe explained the objectives and organization of the group. He explained the types of meteorological and physiological research being applied to the problem. He explained the balance that has to be achieved between industrial and agricultural planning and the weather, and the compromise forced on this dry country, where weather suitable for good smog dispersion is unsafe because of the fire hazard. He explained that study of smog sources is being concentrated on automobile fumes, public rubbish disposal, and industrial waste disposal. The lack of fundamental methods for analyzing air for small amounts of offending fumes to uncover their composition was pointed out. The lack of medical knowledge on the exact effect of waste disposal fumes was acknowledged. Altogether, Dr. McCabe made it plain that his problem is no easy one from the word go, and that it would be some time before the effect of his office would be noticeable. He did stress that the elimination of physical discomfort from fog and smoke is his primary objective.

Our latest meeting was held on December 17 at the Rodger Young Auditorium in Los Angeles. The speaker was Arthur E. Raymond '21, Vice-president of the Douglas Aircraft Company. In attendance were about 54 Alumni.

The subject for the evening was the developing field of aerial missiles. Mr. Raymond classified them as being of four types: ground to ground, ground to air, air to ground, and air to air. He pointed out that any type could be made to carry new, extremely destructive weapons, such as atomic bomb variations and bacteriological

bombs. The imaginable variations of the pattern of attack on this country are so great that we cannot possibly hope to develop a defense against all. Consequently, he pointed out, there is a major need for adequate intelligence information to keep our military informed of the actual weapons being developed by potential enemies so that our development may be concentrated on satisfactory antidotes. An adequate defensive network for this country requires so much equipment on such a vast scale that adequate provision of detection and interception apparatus is hazarded to be unlikely. Hence, again, our best defense probably lies in striking an immediate and adequate counterblow. Aerial means will probably be depended on to deliver the blow.

Mr. Raymond outlined some of the strong objections to pilotless missiles and emphasized that economically such missiles are terrifically expensive, as they cannot be recovered and reused. While outlining some of the hazards confronting a strategic bomber of the future, he made it very clear that an accuracy can be obtained with missiles delivered by piloted aircraft which cannot be obtained by any other means immediately foreseeable. Mr. Raymond repeatedly emphasized during his talk the seriousness of any new outbreak of war. He pointed out that there could be no winner of a future war. There would be someone on top of the heap, to be sure, but the heap wouldn't be worth much. The program and methods of Secretary of State Marshall were endorsed by the speaker. He made the point that implementation of the Marshall plan would build a Europe sufficiently strong to make a direct attack on the United States by any power very improbable. His message repeated what we have heard from many since the war concerning the devastating power with which man has equipped himself to fight future wars—a power that can only tear the presently civilized nations to pieces.

After the meeting, Mr. Raymond answered questions until it was time for adjournment. These questions and answers were in themselves very interesting. In regard to the engines of future aircraft, Mr. Raymond outlined the uses of the three principle types: reciprocating, prop-jet, and jet. He pointed out that the reciprocating type would still be used for a long time because of its economy, but that military airplanes cannot sacrifice speed for economy and must use the latest and most powerful engines available. This left commercial aviation as the last hunting ground for piston engines. With regard to supersonic windtunnels, he explained the difficulty of testing infinitely small models in infinitely large tunnels to obtain transonic data. He explained the reasons behind the present government program with full-scale, high-speed airplanes for research. He expressed the opinion that the future would bring commercial aircraft of faster and smaller capacity than are now used, with a consequent increase in air transport flexibility. He felt that air cargo is in an early developmental stage and that serious military sponsorship of cargo-type aircraft development may reasonably be expected. These, and

many similar short topics discussed, made the meeting very interesting.

Alumni in attendance at the meeting of November 17 were as follows: M. A. Abel '41, H. A. Babcock '12, B. W. Badenoch '39, W. W. Baldwin, Jr., '39, P. K. Bates '24, H. E. Beebe '10, R. H. Boden '34, T. W. Brockenbrough '46, W. H. Brothwell '33, L. W. Burnham '14, E. W. Carlton '25, E. K. Chase '06, R. W. Conant '23, J. H. Driggs '21, A. A. Fogliano '39, Theodore Gunlock '43, C. J. Hamlin, Jr., '31, J. E. Hawkes '39, B. B. Helfand '43, P. A. Herrick '24, J. T. Holmes '14, R. W. Hunn, Jr., '28, W. F. Jenrick, Jr., '39, J. O. Johnson '44, J. B. Kendrick '34, H. W. Kohl '37, H. B. Leslie '38, F. J. Lopker '33, Leo Maas, Jr., '40, M. A. McClure '22, Robert McKenzie '31, William Mellem '15, F. B. Morton '13, E. W. Nelius, Jr., '47, R. R. Newman '03, M. L. Norden '41, Myron Norman '39, R. J. O'Donnell '46, W. H. Phinizy '38, J. B. Pitkin '37, F. M. Post '21, D. B. Powers '26, W. B. Rivers '15, S. A. Rose '37, R. S. Rouffa '43, Harold Sharp '09, P. P. Shelby '32, K. B. Tuttle '46, G. M. Watters '42, H. M. White '44.—D. DONALD WEIR '38, Secretary, 1492 North Doheny Drive, Hollywood 46, Calif.

M.I.T. Association of Buffalo

On October 29, Dr. Karl Compton paid the Club a long-hoped-for visit. In the midst of a busy itinerary, the President of M.I.T. was met on his arrival at Buffalo by George Duryea '17, Whitworth Ferguson '22, Marvne Gorham '93, and Walter Sherry '37, and embarked on a busy day in Buffalo. In the morning he visited the embryonic school of engineering at the University of Buffalo. At noon he was entertained at the Saturn Club by Samuel Auchincloss '27, together with the reception committee of our organization and local luminaries including Chancellor Capen of the University of Buffalo, Charles Fichtner of the Chamber of Commerce, principals of leading private and public schools, and business executives. Mr. Auchincloss had worked closely with Dr. Compton in Australia during the war. In the afternoon the reception committee escorted our visitor through the local Western Electric plant and through the Cornell Aeronautical Research Laboratories.

In the evening, Dr. Compton addressed 90 Alumni gathered at the Buffalo Trap and Field Club, on present developments in Cambridge. Alumni came from the Niagara frontier section, with a sizeable delegation from the Niagara Falls M.I.T. Club. The pleasure of the evening was heightened by music throughout dinner; and Technology songs were led by Joseph R. Ryan '31. Recognition was given to H. L. Noyes '90, oldest graduate present. It was a credit to Marvne Gorham '93 that he so briskly and actively escorted Dr. Compton through his full day in Buffalo. Dr. Compton's speech, besides reacquainting the Alumni present with recent local accomplishments at Technology, urged those who attended to weld themselves into a group which could spread the message of M.I.T. The thanks of the Club are due to Whitworth

Ferguson for his arrangements of the day's program for Dr. Compton, to President Duryea for his management of the evening's entertainment, to Marvne Gorham for his life-long interest and activity in Technology affairs, and to Vice-president Matthew Hayes '36 for his invaluable assistance with registration. This meeting goes down as an outstanding event in the history of this Club's relationship with the Institute.

Among the Alumni present were the following: M. C. Abbott '38, O. F. A. Arnold '40, S. S. Auchincloss '27, R. D. Bates '14, H. J. Beierl '15, J. A. Bergantz '41, W. W. Bird '34, R. L. Black '45, J. D. Bowman '20, R. S. Brookman '35, R. G. Brown '16, B. C. Buerk '30, H. C. Button '23, L. F. Cavendish, Jr., '38, C. A. Chamberlain '40, G. J. Chambers '12, W. O. Christy '31, M. R. Chudy, Jr., '45, C. C. Coakley '17, P. A. Davis '31, C. P. Davis '19, V. J. Dobert '36, W. H. Duffield '10, C. A. Dutton '23, C. O. Dodson, Jr., '42, G. R. Duryea '17, G. J. Easter '15, R. E. Elden '44, Whitworth Ferguson '22, H. E. Gabel, Jr., '41, M. B. Geiger '28, J. H. Genrich '31, Marvne Gorham '93, Theodore Green '05, Theodore Green, Jr., '30, G. W. Harvey '24, C. A. Houck '05, M. N. Hayes '36, Vladimir Hwoschinsky '40, A. W. Hosig '23, Gabe Hilton '15, L. H. Jones '16, A. E. Karnuth '43, J. H. King '36, R. K. Koegler '36, Christian Kurtzmann '09, I. Z. Lenzner '43, R. W. Lindsay '07, E. H. McCormick '32, D. C. Mitchell '34, H. D. Mitchell '12, D. P. Moynihan '22, J. S. Mulholland, Jr., '45, J. B. Neal '15, B. H. Nelson '35, H. L. Noyes '90, F. R. Park '46, J. J. Parks '43, G. D. Ray '36, C. N. Richardson '16, R. E. Robertson '41, R. B. Rumsey '43, J. R. Ryan '31, K. G. Scheid '45, W. H. Sherry '37, J. S. Slosson '35, T. H. Speller '29, Nelson Stone '15, H. G. Swan '18, H. L. Townend '23, S. A. Tirrell '41, Ehrler Wagner '37, D. W. Whitcomb '42, L. M. White '12, J. L. Wilson '41, Theodore Wroblewski '39.—WALTER H. SHERRY '37, Secretary, 229 North Forest Road, Williamsville 21, N. Y.

M.I.T. Club of Chicago

The second meeting of the 1947-1948 season was held at the University Club on December 8, with an attendance of about 60. John Praetz '28 of "Minutes" fame was toastmaster with Ben Sherman '19 making the arrangements as dinner chairman.

Admiral Cochrane '20, now head of the Department of Naval Architecture, was the speaker. He gave us a very interesting picture of the position of M.I.T. with reference to future naval needs and flavored it with interesting stories taken from his experience during World War II.

All present expressed interest in the "Minutes" sent out after the previous meeting, and a new issue followed this one. A definite date has not as yet been set for the next meeting, but a live program up to past standards is planned.—STANLEY M. HUMPHREY '28, Secretary, Booz, Allen and Hamilton, 135 South LaSalle Street, Chicago, Ill.

M.I.T. Association of Cleveland

The Association has lately received the good news that Professor E. H. Schell '12 will be its guest for the May meeting. This is particularly interesting in that Professor Schell has the splendid ability to keep his audiences completely absorbed in his subject. Many of us can remember his addresses in Course XV, each of which left us with encouragement and assurance that success in business would be ours if we would recognize the many opportunities around us.

Brown's Cottage Restaurant has become our 1947-1948 meeting place and should be accessible to all Clevelanders. Our last attendance of more than 50 indicates that we are probably meeting the desires of a good many Alumni. Those of you who have not been with us lately should make a special point of setting Thursday, February 17, on your schedule as our next regular dinner.

At the time these notes are being written, we are making preparations for our Christmas-New Year's luncheon with the current Tech men of Cleveland as our guests. We look forward each year to the time when we can again say "how young they seem," or, as in this case, "how mature," since many men lost time while in service and are now considerably older than the average student used to be. Our luncheon at the University Club will provide an introduction for the students to this Association or, for that matter, to the alumni association in any city where the student makes his first postgraduation home. Technology is shown to be "guaranteed not for four years but for life." — G. R. YOUNG '37, Secretary, 300 East 131st Street, Cleveland 8, Ohio.

Detroit M.I.T. Association

The subject of television attracted a group of some 70 members and guests to our dinner meeting held on November 18 at the Wayne Club. After the excellent meal, our President, Douglas B. Martin '25, called the meeting to order. The principal item of business was the annual election of officers. The slate named by the nominating committee, made up of Bob Doremus '14, John Longyear '26, and Dave Sutter '26, was elected by unanimous ballot. The new officers are as follows: President, Francis H. Rutherford '28; Vice-president, John T. Cronin '17; Secretary, L. Willis Bugbee, Jr., '21; Treasurer, R. Gordon Spear '26. President Martin then introduced our guest speaker, Herbert Tank, engineer in charge of television facilities in Station WWJ, Detroit. Illustrating his talk with an informative motion picture, the speaker gave his audience an excellent outline of the present-day development of this form of entertainment in Detroit and surrounding sections. He estimated that there are at present 4,000 receivers in the city, with new installations being made at the rate of 500 a month. After a question-and-answer period, the group adjourned to the studios of Station WWJ, a few blocks distant. There an inspection included the television stage, the mechanical and electrical facilities and the viewing of incoming programs on various types of receiver.

Those present included the following: Maurice L. Ash Jr., '26, Chesley Ayers '34, Bruce R. Bagley '35, Philip C. Baker '16, Eugene J. Barney '16, Arthur E. Benson '26, B. Gratz Brown '29, L. Willis Bugbee, Jr., '21, J. Barrett Burnell '40, Charles H. Burnham '22, Harvey W. Chapman '30, William S. Coleman, Jr., '46, Charles S. Comey '22, Arch H. Copeland, Jr., '38, John T. Cronin '17, John B. Davidson '42, Robert C. Doremus '14, Everett F. Doten '19, Henry M. Foley '12, Harvey S. Freeman '46, Herbert F. Green '29, Charles L. Hall '15, William W. Harris '22, Robert D. Harvey '47, Fredrick K. Hine '16, Harry H. Kaw '22, Oliver K. Kelley '27, David R. Knox '27, Arthur Leslie '47, John E. Longyear '26, William H. Manning '24, Douglas B. Martin '25, Everett V. Martin '24, Alvin A. Markus '47, Robert W. Monsarrat '37, Willard B. Paine '30, Worth H. Percival '47, Milton W. Pettibone '17, Frank N. Phelps '13, W. F. Rahles '34, John D. Rumsey '33, Francis H. Rutherford '28, James M. Scofield '41, Robert W. Seavey '42, R. Gordon Spear '26, Raymond D. Strout '39, David M. Sutter '26, Edmond J. Tyberghein '44, Ernest W. Upton '43, George R. Weinbrenner '40, Robert W. Wright '32. — JOHN T. CRONIN '17, Secretary, 198 Monterey Avenue, Highland Park 3, Mich.

M.I.T. Club of Hartford

The first dinner meeting of the season was held at the Bond Hotel in Hartford, Conn. Professor Charles E. Locke '96, Alumni Secretary, and Robert M. Kimball '33, Administrative Assistant to President Compton, were the speakers. Professor Locke's introductory remarks covered the increased activities of both the Alumni and the undergraduates. Alumni activity was indicated by the organization of new clubs and more active participation in alumni affairs. Professor Locke also discussed two coming publications, of interest to all graduates, the new Register of Former Students and a book on the Institute's participation in the war effort.

Mr. Kimball discussed the present-day administrative problems accompanying the increase in the size of the student body and a proportionate increase in the plant and instructional facilities at Technology. Highlights in Mr. Kimball's talk were scholastic and social student activities (the problems of the veteran student as husband and father are multitudinous), war and postwar research activities at the Institute, and the continuation of Dr. Compton's efforts to socialize the teaching of the sciences. While sinusoidal dormitory design appears to be a step in the opposite direction, the advantages of this type of construction cannot be denied. About 30 men attended this meeting, and we were pleased to welcome Minot R. Edwards '22, Secretary of the Springfield Club. — JOSEPH R. KRENN, JR., '38, Secretary, 55 Kelsey Street, New Britain, Conn.

Southwestern Association of M.I.T.

On November 20, the Association held an informal evening gathering at the Hotel Muehlebach; 23 members of the Kansas

City group were present. Our guest of honor was Professor B. A. Thresher '20, Director of Admissions at the Institute, who had not been in Kansas City since 1941. Everyone was greatly interested in the informal discussion led by Professor Thresher, who covered many topics relative to M.I.T. — all the way from the new library building down to the elimination of monkey drill and its replacement by systematic instruction in sports for every student.

Beer and Jim Irwin's Royal Crown Cola were served. The party broke up at about 10.30 P.M. — REGINALD W. BULKLEY '27, Secretary, 840 Westover Road, Kansas City 2, Mo.

M.I.T. Club of Milwaukee

We were very fortunate in having Admiral Edward L. Cochrane '20 as our guest at a dinner meeting at the University Club on December 9. Admiral Cochrane explained that his chief object in coming to Milwaukee was to deliver a special beer mug to Phil Cristal '17 from Lobbie, but obviously his mission had an even greater purpose than that. He described the industrial co-operation program at Technology and the recent changes and improvements in undergraduate studies there with the greater emphasis now put on the humanities. Admiral Cochrane's main topic, however, was the part played by the School of Naval Architecture and Technology in the naval development of this country in the past and during the recent war. Questions from the floor after the speech brought out many interesting facts from Admiral Cochrane's tremendous store of knowledge on naval subjects.

Plans for the near future were announced by David G. Smith '31, President. On December 30 a noon luncheon will be given to Milwaukee men now attending M.I.T. A regular dinner meeting is scheduled for late in January. Those attending the last meeting were as follows: Mortimer P. Allen '13, Roland H. Becker '22, Ralph E. Boeck '28, Richard W. Cobean '40, Philip N. Cristal '17, Trevor O. M. Davidson '21, John F. H. Douglas '05, Halbert S. Gillette '45, Frederick R. Gruner '41, William Hahn '42, Arthur G. Hall '25, A. Preston Heintz '38, Alvah S. Holway '14, Edwin F. Hulbert, Jr., '36, John E. Kearns '32, William Mark '43, Chester E. Meyer '36, Leo B. Miller '15, Will Mitchell, Jr., '46, David V. Nason '13, Herbert W. Oedel '46, George W. Pollock '21, David G. Smith '31, Lemuel D. Smith '06, Winthrop A. Stiles, Jr., '36, Bruno H. Werra '32, Stuart C. Westerfield '31. — WILLIAM HAHN '42, Secretary, 2355 South 76th Street, Milwaukee 14, Wis.

M.I.T. Club of Philadelphia

Cecil B. Annett '02 passed away at his home in Moorestown, N. J., on December 7. He was formerly treasurer of the Campbell Soup Company and took an active part in our Club. Before the war, he was a member of our executive committee for several years.

Your scribe has been busy getting the address files up to date. The cards have been compared with those in Cambridge

through the help of Professor Locke '96. If anyone knows of a former student of M.I.T. in the Philadelphia area who has not received a notice from our Club in the past six months, please give his name and address to Sam McCauley at the address below. Changes of address, too, are, of course, always welcome.—ROBERT M. HARBECK '28, Secretary, 605 Foss Avenue, Drexel Hill, Pa. Assistant Secretaries: SAMUEL K. McCAULEY '41, 288 Copley Road, Upper Darby, Pa.; WILEY F. CORL, JR., '39, Box 358, Bryn Mawr, Pa.

M.I.T. Club of Western Pennsylvania

Our third monthly meeting was held at the University Club in Pittsburgh on the evening of November 18. It was attended by 28 members and one guest, who began assembling at 6:30 P.M. for half an hour of congenial discussion before the excellent buffet dinner at 7:00 P.M. In the absence of R. G. Lafean '19, the brief business meeting was conducted by Vice-president Joseph J. Strachan '13. The floor was then turned over to George M. Hoffman '28, who introduced the speaker, Henry Rockwood '32, chief of the Weather Bureau. After his talk on "Why the Weather," Rockwood conducted a lively discussion period.

Among those present were the following Alumni: W. C. Allen '33, H. M. Baker '30, E. M. Barnes '23, C. T. Barker '27, W. J. Bates '35, W. U. C. Baton '04, W. K. Bodger '40, H. L. Bone '17, G. S. Brosky '45, E. L. Chappell '24, J. W. Church '22, C. N. Cresap '42, H. H. Hall '14, G. M. Hoffman '28, B. M. Hutchins '32, J. W. Logan, Jr., '20, H. W. McIntosh '19, G. A. Morrison '09, G. C. Morrisette '35, E. K. Owen '41, G. N. Reed '23, J. F. Robinson '22, P. M. Robinson, Jr., '44, Henry Rockwood '32, C. D. Robson '41, J. J. Strachan '13, J. L. Thistle '32, and P. R. Toolin '39.—WILLIAM J. BATES '35, Secretary, 141 Woodhaven Drive, Pittsburgh 16, Pa.

M.I.T. Club of Rochester

Television prospects and the development of radio broadcasting in general during the next year were outlined to the Club by Lee McCanne '27, Vice-president and general manager of the Stromberg Carlson Company at a meeting held on December 2. A great increase both in the number of transmitters and in the number of receivers for all phases of radio broadcasting was predicted.

Television in particular, McCanne said, may benefit greatly from the restrictions now being imposed on amplitude modulated and frequency modulated radio broadcasting by Petrillo and the American Federation of Musicians. Since television has had several months of experience in producing programs with no live music and since the video programing offers a much greater range of possible material and audience interest, it is possible that curtailment of music from amplitude and frequency modulated stations will give television the opportunity to expand into this large gap in audience reception. Expansion seems limited only by the manufacture of sets

and the establishment of suitable transmitters in the numerous cities that want television.

The chief development in amplitude modulation, McCanne said, is the astounding increase in the number of stations. This number has already doubled the pre-war total, and an equal number of applications are still on file, pending action by the Federal Communications Commission.

Possibilities of F.M. broadcasting are just now being explored. For the local broadcaster, frequency modulation offers lower initial cost and greater selectivity of signal. Broadcasters have been delayed about two years, however, in the design and construction of high-power stations. Choice of the higher frequency band, which now seems ill-advised, is primarily responsible for the delay in both transmitter and receiver construction.

Television, even though expensive, has achieved a demand manifold beyond its early predictions. At least 10 to 12 large stations in the bigger cities are now operating, with 52 more under construction, and 21 applications pending. It is estimated that about 48 stations will be in operation by the end of 1948. Television is expensive in all phases, since a staff of about 77 men is needed to operate each transmitting station, and since the competition in the lower priced receiver field is aimed at the \$150-\$300 bracket.

Television broadcasting is limited to 13 channels available in its assigned frequency band. To prevent interferences, a maximum of seven is available in any one city, and the possibilities of interference from contiguous territories and neighboring cities limits still further the number of channels assigned to any one locality. Rochester, for example, may have a maximum of only three channels. Current difficulties in putting television on the air in Rochester and the delays in locating and constructing a suitable transmitting tower, appear on the surface to indicate lack of interest in Rochester television; it is not inconceivable that the channels reserved for Rochester may be reassigned to other localities where the demand for more channels is great.

It was forecast that three million F.M. receivers would be sold in 1947, but the complications and delays arising from the higher frequency band assignment have limited production to 1.25 million. In this same year 175,000 television sets will be sold! Estimates are that 600,000 television sets will be sold in 1948 and 1.2 million in 1949!

Largest unpredictable factor in the future of broadcasting is the attitude and effectiveness of the American Federation of Musicians. It has been rumored that Petrillo has outlined a seven-step plan to force every broadcasting station throughout the country to maintain a full complement of musicians in its own studios. Four of these steps have already been taken: (1) Take live instrumental music off television. This was done in August. (2) Take live instrumental music off F.M. networks. This was effective in September, with the exception of one contract, and will be complete when this contract expires. (3) Stop making broadcast transcriptions. (4) Stop recording master discs for the production of home

records. These last two steps become effective on December 31 with the expiration of contracts covering such work. Record companies have accumulated so extensive a backlog that it may be one year before Step 4 is felt throughout the country.

A further battle plan calls for the following: (5) Take live instrumental music off A.M. networks. The present contract expires on January 31, but there has been no word of whether that threat will be invoked at this time. (6) Ban instrumental music on individual F. M. stations. (7) Ban instrumental music on individual A.M. stations. These last two are steps to be taken only as last resorts to force capitulation.

There are indications that Petrillo is now somewhat more conciliatory, perhaps because a number of suits are pending against him, and Congress has shown indications of further curbing his activities. It may be only strategy, however, to settle separately with the recording, broadcasting, and other companies employing musicians; if successful, the elimination of a united front and the negotiation of separate settlements may postpone the decision and make the fight against Petrillo a long dragged-out affair.

McCanne discussed also the peculiarities of obtaining adequate television and F.M. transmission for Rochester. The transmitter must be located about 500 feet above the surrounding terrain, but available locations are limited by the proximity of the airport's minimum glide angle, and by the location of aviation radio beacons traversing part of the city. In the areas left free from these interferences, there are few natural prominences and no buildings capable of supporting a transmitter 500 feet above surrounding terrain. Erection of a successful transmitter will require active co-operation from the public and from the zoning board.

The following members were present: Harold E. Akerly '10, Collin H. Alexander '39, Sydney Alling '11, Joseph H. Altman '42, Malcolm A. Beers '47, James S. Bruce '39, Howard F. Carver '32, Alfred E. Castle '40, C. King Crofton '22, Alfred Dasburg '36, Evan A. Edwards '37, Harry E. Essley '36, Reynold A. Grammer, Jr., '47, Frederick J. Hopkinson '20, Frederick J. Kolb, Jr., '38, William J. Knox, Jr., '29, Raymond H. Lambert '24, Gerould T. Lane '13, Harold H. Leary '23, Kenneth J. Mackenzie '28, Lee McCanne '27, Charles F. Payne '33, Ralph W. Peters '30, Robert M. Phinney '04, James H. Rial, Jr., '47, John A. Rodgers '35, John H. Rogers '30, Howard J. Samuels '42, Hugh McC. Shirey '22, Cyril J. Staud '24, Benjamin W. Steverman '31, Douglas MacM. Stewart '33, Harold O. Stewart '09, Henry H. Tozier '96, Dwight Vandevate '22, Stanley C. Wells '30, Paul B. Wesson '98, Richard M. Wilson '30, Charles F. Wray '95, Clarence L. A. Wynd '27.—FREDERICK J. KOLB, JR., '38, Secretary, Building 14, Kodak Park, Rochester 4, N.Y.

M.I.T. Association of Japan

On November 8 the Club had a sukiyaki party at the home of Yoshio Mikimoto '38. We were able to welcome six new Alumni from among the occupational forces (names starred in the list below). Mrs. Furuichi and Mrs. Kametani demonstrated the tra

ditional tea ceremony. Those present were as follows: (Occupational forces) Bernardo P. Abrera '32, *Turner W. Gilman '34, Bedrich V. Hettich '43, Harry C. Kelly '36, *Charles S. Stodter '24, Hyman Weinberg '28, George Yamashiro '42; (Overseas Consultants, Inc.) *Edward T. Barron '05, *John C. Damon '05, *Harry W. Pierce '26, *William T. Smith '21; (Japanese members) Ryohei Arisaka '17, Yoshinori Chatani '22, Tatsuo Furuichi '14, Yutaka Hara '33, Masaru Kametani '25, Juntaro Kawai '21, Yoshio Kubota '23, Takanao Kuki '29, Yoshio Mikimoto '38, Masaru Miyauchi '29, Juichiro Okada '20, Koichi Oye '30, Mimbu Sasaki '28; (ladies) Mrs. Kelly, Mrs. Hettich, Mrs. Furuichi, Mrs. Kametani, and Mrs. Mikimoto.

The older Japanese Alumni were extremely pleased to welcome the Alumni from the Overseas Consultants, Inc., in that it enabled them to reminisce about the old Tech on Boylston Street. The old boys can't quite picture the greatly expanded present Institute.

On December 12 another meeting will be held. At that time it will be a pleasure for those of us of the occupational forces to meet Takanaga Mitsui '18 for the first time. He was long the president of this Club; but on account of various postwar conditions, he has been living of late in Kyushu, the southernmost of the four main islands. Alumni who visited Japan before the war may be interested to know that the Mitsui Club, where we used to entertain, has been taken over for the General Headquarters Officers' Club. Hence, our meetings have had to be held in an office building in town. Although this situation does not provide us with a clubroom exclusively our own, we are glad of a place to meet.—MASARU KAMETANI '25, Vice-president, 71 Shimizumachi, Suginamiku, Tokyo. GEORGE YAMASHIRO '42, Associate Secretary, Economic and Scientific Section, General Headquarters, Supreme Commander of Allied Powers, A.P.O. 500, San Francisco, Calif.

M.I.T. Alumni Association of Utah

Paul M. Chalmers, Associate Professor of English at the Institute, spent Friday and Saturday, October 24 and 25, in Salt Lake City. Advantage was taken of his presence to hold a luncheon meeting at the Alta Club, which was attended by 12 members of this Association. Our President, George M. Gadsby '09, presided and introduced Professor Chalmers, who proceeded to describe in a most interesting way the growth of the student body and present conditions at the Institute. He explained the effect of the great volume of applications for admission upon the procedure in the office of the Director of Admissions, Professor B. A. Thresher '20. The method of correlating an applicant's scholastic record with the results of his interview with the local Honorary Secretary, the weighing of "character," and letters received, as well as his compliance with the other requirements for admission, were features impressive to all. The selection of desirable students from the great number applying is made on the basis of broad criteria assuring the maintenance of the valuable hallmark of an M.I.T. diploma. Professor Chalmers' informal talk,

interspersed with the inevitable humor incident to the handling of so many and diverse applications, made the hour pass all too quickly.

Our great distance from Technology makes us relish the visits of faculty members; we look forward to seeing Professor Chalmers again, or other representatives of the Institute who may be able to come this way in the future. It was agreed that the annual meeting of the Association should be held on January 9, at which time H. E. Lobdell '17, Executive Vice-president of the Alumni Association, plans to visit Salt Lake City.

The following members were present: W. J. Cope '37, D. A. Elkins '36, Ralph M. Emerson '14, George M. Gadsby '09, Lehi R. Gardner '45, George Gross '32, Howard M. Hurst '40, James R. Long '35, Stephen L. MacDonald '39, David D. Moffat, Jr., '41, George H. Smeath '45, Lynn M. Thatcher '38, and Francis T. Whitworth '21.—MARVIN P. EGLESTON '31, Secretary, University Club, 136 East South Temple Street, Salt Lake City 1, Utah.

M.I.T. Club of Schenectady

There has been no meeting of the Club since the annual dinner on October 16. The steering committee, consisting of Bob Brown '43, Ivor Collins '41, Leo Dee '35, Bill Rodemann '44, Hal Chestnut '39, and Joe Quill '41, met for luncheon to plan club activities for the next few months.

An evening meeting was scheduled for sometime in January with W. D. Coolidge '96, director emeritus of the General Electric research laboratory, as the guest speaker. More time will be available for discussion and getting acquainted with one another than at our usual luncheon meetings. The Club feels extremely fortunate in having secured Dr. Coolidge, in view of his very busy schedule.

In an effort to fulfill the club objective "to further the well-being of the Institute by fostering the interest of Alumni in the Institute and in one another," the steering committee has initiated plans for the Club to sponsor a musical program or some other function designed to raise money. The money will be used either to bolster our somewhat depleted scholarship fund for sending worthy students to M.I.T. or for some similar purpose to be decided upon when the money is raised. It was pointed out that this is a rather ambitious undertaking which will require the co-operation of all the members of our Club. Bill Rodemann is in charge of the undertaking, and he plans to give every member of the Club an opportunity to help. There will be more news of this affair in the notes for coming issues.—JOSEPH S. QUILL '41, Secretary, 226 Jackson Avenue, Schenectady 4, N. Y.

M.I.T. Club of Central New York

Dr. Compton was our guest at an alumni dinner meeting held in Syracuse on December 8. He made the trip to this city to give an address at the graduation exercises of the Carrier Institute of Business. Fortunately for us, Dr. Compton was able to arrange his schedule beforehand to include

about two hours for the Alumni of central New York. Forty-seven Tech men and guests, the largest turn-out since this section was re-activated, assembled to welcome Dr. Compton and to enjoy the refreshing fellowship of the occasion. In the all-too-short time that our illustrious President was able to give us, he told of the plans and activities of the Institute and described some of the changes that have taken place in the last few years.

Hurrying back to the hotel after dinner, Dr. Compton spoke to several hundred Carrier employees and guests. Discussing America's vast program of mass education, he said: "Many American scientists and other scholars have been concerned over the fact that so many great ideas which have revolutionized science and thought have been coming from scholars in foreign countries, where mass education is not the rule. . . . I think that this is not an argument against mass education, but it is a warning that mass education must not be permitted to prevent, by the swamping force of numbers, the providing of exceptional opportunities for the development of genius and leadership among those young people who show really great promise." By his keen analysis of what is happening to the educational system in America today, Dr. Compton brings a firm reassurance that the individual will not be overlooked or forgotten.—D. EARLE MACLEOD '38, Secretary, 211 Columbia Avenue, Syracuse 7, N. Y.

CLASS NOTES

1888

Mrs. W. H. Siebert, or as we knew her, Annie Ware Sabine, died on November 7 at her home, 182 Tenth Avenue, Columbus, Ohio. She was born in Cambridge, a descendant of one of the founders of Rehoboth, and was graduated from Ohio State University in 1884 before matriculation at Technology in Course VIII, in which she was one of the first women to receive a degree. When we knew her, she was a very pretty brunette, who developed into a most attractive woman. In 1908, she married and lived at 40 Shepard Street, Cambridge, Mass. She became a distinguished painter of miniatures and in her collection of portraits numbered some of the late Charles W. Eliot, former president of Harvard, and Mrs. Eliot. She also collaborated in historical research with her husband, W. H. Siebert, emeritus professor of history at Ohio State University, who survives her.

The following extract from a newspaper clipping gives some facts of Arthur Conner's life not included in the editorial account quoted in December: "On Saturday, August 30, following a brief illness, Arthur Jewett Conner, died at his home on Front Street, Exeter. He was in his 80th year. Mr. Conner was born in Boston. His parents were William N. Conner of Exeter, and his mother was Emily Hart of Plymouth, Mass. He was prepared at the English High School for Technology, from which latter institution he was graduated in 1888. A few years later he inherited the

old Conner homestead on the Epping Road, and thereafter Exeter was his home. All his life he was interested in town affairs. For two terms, in 1931-32 and in 1933-34, he represented Exeter in the House. In 1937-38, he was a member of the New Hampshire Senate, representing the 23rd district. He is survived by his wife, Mrs. Katherine (Carlisle) Conner, and two daughters, Mrs. Charles Rich of Holden, Mass., and Mrs. Warren M. Greer of Nashua, and five grandchildren."

Ralph Sweetland's new address is 47 Walnut Street, Natick, Mass. — BERTRAND R. T. COLLINS, Secretary, 291 Nassau Street, Princeton, N.J. SANFORD E. THOMPSON, Assistant Secretary, The Thompson and Lichtner Company, Inc., Park Square Building, Boston 16, Mass.

1891

No news might be considered as good news, so far as we old-timers are concerned. There has been too much of the wrong type in the last two issues of *The Review*, and we should like to remain with undiminished ranks, for a while at least. The work of your Secretary has been at a low ebb for several months, not, we hope, for lack of interest, but simply a slowdown on correspondence and relatively few contacts. The personal news items that have come to our attention do not seem to be encouraging. Steve Bowen and Ambrose Walker are in Winter Park, Fla., for the winter. Steve is at the Virginia Inn, where he has been for several seasons.

You may wonder by this time what happened to our usual winter dinner, and you may have a circular letter before you read this. As we do not plan for more than one get-together each year, it seems advisable to have this in the spring — May or April — rather than in midwinter, chiefly because of the weather and several of our active attendants who come in their cars from suburban or outlying places. So when you read this (if not before), you can tell me whether this change will fit your plans. We have about 80 left on our list, with known addresses, more than half of whom are actively interested in the Class; but the larger proportion of these live too far away or for other reasons cannot attend our dinners. Fifteen would seem to be the maximum we may expect; so we hope that all who can will continue to come to our annual get-together.

Another nice letter comes from Robert Ball in Cambridge, England. They are having a hard time of it over there, but an Englishman seldom complains, setting a good example for us to follow. Too bad Robert is so far away, as we should all like to see him. "You ought to have had an answer to your welcome letter from Longwood Towers ere this; certainly procrastination is the thief of time. And now your class notes have come in — a reproach for my delay in replying. I am very sorry to get the news of Harry Bradlee's passing. He had great gifts and he made the most of them. I remember him as a quiet, studious man whose companionship was a pleasure. The firm of Stone and Webster owes much to his business ability, and his place will be hard to fill, as he had so many outside interests. The firm of Mather and Platt is

well known here, by reason both of the young men who have gone from the University to take up work with them and of the great name they have.

"I am sorry I have not a photograph of my house to send you in return for your description of your home. I built this house 18 years ago on a piece of land situated on the outskirts of the town about two miles from the center with open views all round. The garden is at the back from the quiet 'Way,' and my study faces south and gets all the sun there is, and this summer we have a goodly supply. Our vegetable garden keeps us supplied the year round with vegetables for the table, and we have enough apples to supply our wants until the summer is out (about 10 months in the year). I note you have given up motoring. Unlike you, I use my car almost exclusively for getting about and, as my wife does not drive, have to act as chauffeur for both. Our mileage has to be adjusted to the petrol ration, yet we seldom have recourse to the train. Our journeys sink into insignificance when contrasted with the magnificent sweep of Ernest Hersam across your great continent. But that was a major exploit and not typical of your usual traffic! We have still enough petrol for our modest needs and can circulate about our tight little island within limits; that may not be so for long, however, as the time may come for further restrictions on the fuel supply.

"No doubt we suffer under many inhibitions and restrictions to which we have to grow accustomed as they are unprecedented in this land of former plenty. But the art of 'making do' has become of itself an added zest in life and to some, perhaps, a blessing in disguise! Regarding the unmatched respect for the law, typical of the race, it is felt that each one of us gets a fair deal and that the restricted supplies are uniformly distributed, and so we carry on. But what a small proportion of our people realize that it is to your country we are indebted for such bounties as we now enjoy. It is a magnificent tribute to your administration, and I trust that the bread you are casting upon the waters for us will return to you. In any case, you have the gratitude of those who know, and I wish it were more widely expressed. After all, a large part of the population of any country, through lack of opportunity to travel perhaps, knows but little of what controls the action of other countries; some, indeed, scarcely know what is going on in their own and, even in the midst of a war, that it is on. I try to keep in touch with American affairs, for we take some New York papers at the club here. Everything seems to be very disturbed on both sides of the Atlantic, don't you think so? I long to have a chat with you when one can let himself go; scribbling is not enough of an outlet to one's feelings. Can you not pay us a visit and take in Mather and Platt as well?"

We also have a letter from Charlie Hantington in Denver, which reads as follows: "A few more days and the sun will turn north again. Old man winter has hardly touched us as yet, however, and I dread the snow and cold which we will surely get later. The ski season is on in full blast, as there is plenty of snow in the hills. Not for me. My only experience on skis was

years ago when I was mining. Our mine was at about 10,000 feet elevation, with four or five feet of the beautiful snow, and our telephone line to Creede was down. I made a pair from some old lumber and started on the trek. As long as the trail was fairly level, I had no trouble. Finally, I came to where it took a very sudden and steep dip to the cañon below. I started down, only to land against a tree and in deep soft snow. Finally, I slid down and reached a road. Those homemade skis are probably there yet. If you have a gathering of '91 this winter, please extend my best wishes and good luck to all." — HENRY A. FISKE, Secretary, Grinnell Company, Inc., 260 West Exchange Street, Providence, R. I.

1892

The Secretary has no news, as the February issue goes to press, except the death of another of our classmates, Ralph R. Littlefield, who passed away on November 5. Littlefield was formerly associated with the Hazzard Shoe Company of Gardiner, Maine, and more recently he was living, for at least part of each year, at Sarasota, Fla. — CHARLES E. FULLER, Secretary, Box 144, Wellesley 81, Mass.

1893

At a recent meeting of the committee appointed to make arrangements for the celebration of our 55th reunion, it was voted to hold not more than a one-day outing. Furthermore, according to information now in hand, it was deemed advisable not to include the ladies. Of several places considered for holding the meeting, The Country Club in Brookline is most conveniently located and offers the most attractive accommodations and service. Those of us who attended the 50th reunion will undoubtedly remember that we had a very good time at the same place in June, 1943. Consequently, reservations have already been made for Friday, June 11, to include luncheon and dinner, together with the recreational facilities of the Club for the day. Information regarding the time and point of assembly and local transportation will be forthcoming at a later date. The date set for the meeting also makes it possible to attend the exercises and gatherings scheduled for Alumni Day by extending one's visit to Boston and Cambridge over the week end. — FREDERIC H. KEYES, Secretary, Room 7-211, M.I.T., Cambridge 39, Mass. GEORGE B. GLIDDEN, Assistant Secretary, 551 Tremont Street, Boston 16, Mass.

1896

Rear Admiral Bakenhus returned from his vacation trip to the Pacific Coast and Florida, ending with a visit to relatives in Schenectady. He tried to look up some of the classmates there but was out of luck. Doc Coolidge was away for the week end in Washington when Bakenhus was there. Bakenhus has now changed his office address in New York to 75 West Street, New York 6. He is already making plans for the annual '96 gathering in New York at the time when the Secretary and Assistant Secretary are in that city, and the meeting is now scheduled for Monday evening, Febru-

ary 16. As in the past, it will be held at the President Tavern on Lexington Avenue, just round the corner from 41st Street going south. Any classmates who by good fortune happen to be in New York on that day will be most welcome at this annual dinner meeting.

Rutherford writes from Australia that he is very comfortable and in fairly good health, although handicapped by poor eyesight, which prevents him from doing much reading. The climate is wonderful, according to his report, and the thermometer rarely goes below 40 degrees in winter and not unduly high in summer. He has recently made a change of residence to 87 Holdsworth Street, Woollahra, New South Wales, Australia. He is now 20 minutes from one of the best ocean beaches and spends his mornings there every clear day. —CHARLES E. LOCKE, Secretary, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge 38, Mass.

1897

Henry M. Seaver, IV, died in Pittsfield, Mass., on December 9, aged 72 years. He leaves a wife, one daughter, and one grandchild. Henry was for 22 years associated with George C. Harding in architectural work, and they designed many residences and public buildings in Pittsfield, Lenox, and Dalton. He did considerable sketching work and painting in water colors. He served as secretary of the Pittsfield municipal planning board for 23 years.

John R. Macomber, chairman of the board of directors of the First Boston Corporation, retired on December 31. He will continue as a director. Mr. Macomber has been associated with the investment banking business in Boston for a period of 53 years. He has been prominent in horse racing, and at "Raceland," his country place in Framingham, Mass., he has a full-sized flat track and an outside steeplechase track. He is chairman of the finance committee and a trustee of the Institute and a director in many New England industries. He will still maintain these connections.

Among those present at the dinner given to Dr. Compton by the Technology Club of New York on December 9 were the following: Mr. and Mrs. Henry E. Worcester, Mr. and Mrs. George R. Wadleigh, Mr. and Mrs. Thomas R. Weymouth, Mr. and Mrs. Francis H. Shepard and Charles B. Breed. —JOHN A. COLLINS, JR., Secretary, 20 Quincy Street, Lawrence, Mass.

1898

Some of our classmates are looking forward to the Golden Anniversary with exuberance. Listen to this, from the Observer, Braintree, Mass.: "Highlands Breeze — Celebration for 'Boys' of '98: In pleasant anticipation of the 50th anniversary of the . . . Technology class of '98, to be celebrated next June, Frederick L. Hayden of 1881 Washington Street has made his reservation for the gala three-day celebration to be held in Boston, when alumni will gather from all sections of the country for the auspicious occasion, plans for which are already under way. Prominent on the com-

mittee is Roger Babson of Wellesley, eminent statistician of national fame and classmate of Mr. Hayden, who will entertain the gathering at the famous Babson Institute in Wellesley. Mr. Hayden served as chief purchasing agent with the United Drug Company of Boston for eight years following his graduation from M.I.T., and later established his own business in the manufacture of pharmaceuticals in which he successfully continued until his retirement several years ago. He majored at Tech in chemical engineering. In retrospect, it will have been an occasion of magnitude for these alumni to have disregarded temporarily the mellowed anniversaries since '98 as they gather next June to share the camaraderie and joyful reminiscences of a bygone youth — each to become again, just one of the boys."

The program for the Golden Anniversary was printed in the '98 class notes of the January Review. On the first day of the anniversary, Wednesday, June 9, we shall be the guests of Roger Babson at Babson Park, Wellesley Hills, Mass. A letter from Arthur Blanchard, published in the '98 class notes of the May Review, describes a similar occasion at Babson Park, Fla., giving an idea of the good things in store for '98 next June. The program was in the form of a four-page leaflet. On the front and first page were the suitably spaced titles: Annual Business Conference, 20th annual session, Webber College Hall, Babson Park, Fla., on Thursday, February 20, 1947 — Roger W. Babson, chairman speakers' committee. On the third page were listed the events for Thursday, as follows: morning session, Major Frederick Eugene Kunkel, presiding: "The Outlook for Citrus," by Leighton G. Foster, Vice-president and general manager, Florida Citrus Canners' Co-operative; "What About World War III?" by Captain W. D. Puleston, U.S.N.; "When to Invest Money," by Roger W. Babson; and "Question Period," by Mr. Babson and Dr. Spangenberg; afternoon session, Frank M. O'Byrne, presiding: "Business and Investment Outlook in the United States with Special Comments on Florida," by Dr. Leonard Spangenberg, expert of the Business Statistics Organization; "Question Box on Business, Real Estate, and General Problems," by Dr. Spangenberg; "My Experiences at Teheran and Yalta," by Colonel William A. McRae, Jr.; and "How the World Looks to Me," by Ham Higginbottom, who had recently returned from more than 40 years in India. The fourth page of the leaflet described briefly the purpose of Webber College, as follows: founded by Grace K. Babson as the first college in the United States organized, endowed, and operated without profit for the specific purpose of preparing young women to meet the practical responsibilities of both business and married life. In conclusion, Arthur wrote, "Several of the men from this hotel went with me to this conference, and all agreed it was a whole day well spent. Incidentally, a delicious buffet lunch was served free to all comers and presided over by the staff and charming students of Webber College."

If you browse through newspapers and magazines, you have come across, in the January 6th issue of *Look* under the caption,

"Look Applauds These People Who Are Making Good News," a picture of Lester D. Gardner, looking very fit, with the annotation beside it, "He has never been a pilot, yet he has a record of aeronautical achievement matched by few others. For 32 years, he has been one of the ablest promoters of American aviation. He founded America's oldest aeronautical magazine, *Aviation*, and in the 1920's, was advocating luxury air travel — today a reality. During World War I, he organized 73 squadrons for air duty overseas. Then he was president of Aeronautical Industries, and in 1932 he founded the Institute of the Aeronautical Sciences. In 15 years he made it the top professional society of U.S. aviation, and when he retired recently, his work won for him the Daniel Guggenheim Medal — the highest aeronautical honor."

By the way, if you have not yet mailed a contribution to help pay for the literature of the Golden Anniversary, put *The Review* down, pull out the old checkbook and send five dollars to Lester D. Gardner, 251 West 101 Street, New York 25, N. Y. We thank you.

Marco Polo (alias George Cottle) sailed from New York on Wednesday, December 24, for the Canal Zone. Crafty George got away just in time to escape the avalanche of snow that descended on New York City on Friday, December 26. From the Canal Zone, George plans to visit various of the Central American states, then go north to Jamaica, Cuba, and finally Florida, returning to Boston about the middle of February. He has with him the trusty camera for those pictures which he is so expert in taking and describing.

Frank Colcord has decided to stop traveling and settle down. He writes as of December 18 from New York: "From now on my address will be 1645 North Grand Avenue, Covina, Calif. Will you kindly direct all future correspondence to me at this address? Best wishes to you for the New Year." Another '98 man is settled in California. Let's see! According to our records, perhaps not complete, '98 men living in California are Howard Bodwell, Frank Coombs, Everett Curtis, Edward Foulkes, Charles Bodbold, Homer Sargent, and Will Stevens. Quite a pretentious list! You ought to form a '98 California Club and get-together once or twice a year. Perhaps it would be less "classy" and more satisfying to affiliate with one of the M.I.T. Clubs of California, either the northern at San Francisco or the southern at Los Angeles. What's a few hundred miles of travel?

Speaking about California and touring, we understand that George and Elsie Treat had a wonderful time on their trip to that golden state. A bear for work, George has discovered the glories of Yosemite and the delights of travel. We shall expect a full report, George, next June.

Bob Wallace writes that he has returned from Maine to Cleveland. We are happy to learn that his property in Camden, Maine, was not reached by the great fires of last October. Incidentally, the conflagration came within one-and-one-half miles of your Secretary's cottage at Kennebunk Port, Maine; then the wind changed its direction and blew the flames elsewhere.

On the subject of calamities, Edgar Weiner wrote, as of December 17, that he had been smashed up in an automobile accident. Nothing serious—a few ribs broken and some bruises! Let us hope, Edgar, that by the time you read these lines, you will have fully recovered to your usual vigorous and alert self!

Finally, brethren and sistren of '98, you timid ones especially, why don't you send in some more honest-to-goodness copy for the class notes? Yes, I know, you are all coming to the Golden Anniversary, so you think it is not necessary. I forgive you. The enormous salary paid the Secretary is ample compensation for effort to secure adequate copy. —EDWARD S. CHAPIN, Secretary, 463 Commercial Street, Boston 13, Mass.

1899

Chester J. Hogue, IV, died suddenly at his home in Seattle, Wash., on November 4, 1946. He is survived by his widow, two daughters, and two grandsons. A report of the West Coast Lumbermen's Association gives the outline of his career substantially as follows: Author of the world-famed "Douglas Fir Use Book," Chester Hogue had long been recognized as one of the foremost authorities on the characteristics, properties, and uses of wood. He was a leader throughout the Nineteen Twenties and Thirties in the restoration of wood as an engineering material by structural designs keyed to the metal ring connector and to glued-up laminated lumber. Through the years Hogue kept an unflagging interest in all varieties of scientific research and experiment in wood.

After practicing as an architect in Portland for several years, Chester took an industrial engineering position which led to extensive travel in Europe. In 1917, he joined the staff of the West Coast Lumbermen's Association and served as manager of the Portland branch and as New York manager. He lived in Seattle from 1926 on, retiring from active service with the association in January, 1946. Through most of that period Hogue directed the association's trade promotion activities and its technical services. His work took him to the Orient and South America, to the great research laboratories and engineering institutions of the nation, to the industrial and railroad markets for lumber, and into thousands of retail lumber yards. Everywhere he contributed ideas and information of practical value. And everywhere he formed enduring friendships.

The work of Chester Hogue in timber engineering has long been widely recognized by both engineers and lumbermen. Not so well known were his major contributions to small-home construction and to farm building. In 1933, he brought out for the West Coast Lumbermen's Association four engineered designs for low-cost homes which marked the beginning of the great program of small homes promotion that lumbermen and the Federal Housing Administration set going in 1936. Hogue was active for many years in work with agricultural engineers throughout the country for the development of designs for farm buildings. He led in the movement for lumber grade-marking and other phases

of lumber standards. In short, there was scarcely a trail of progress in the specifying and use of lumber during the past 30 years that was not blazed in some manner by Chester Hogue.

He was a life member of the American Society of Civil Engineers and a member of the American Railway Engineers Association, the American Society for Testing Materials, the American Wood-preserving Association, and other engineering groups. —BURT R. RICKARDS, Secretary, 381 State Street, Albany, N. Y. ARTHUR H. BROWN, Assistant Secretary, 53 State Street, Boston 9, Mass.

1900

It is with sadness that we record the passing of our Class Secretary, Burt Cotting, who died on November 17. Although he had been in poor health for some time, his death came as a shock to most of us who knew him. Burt had been secretary for almost 20 years. His office in Boston had become class headquarters, where a hearty welcome awaited all who dropped in to see him. Genial, friendly, and generous with his time and effort, he made an ideal secretary and will be greatly missed by us all. Although he was able to attend the Institute but a short time, he will be remembered as a member of the freshman baseball team. Burt's funeral at Newton Cemetery was attended by Draper, Fitch, Silverman, and Allen.

We also record the death of Dick Westcoat in Taunton on November 23. Although Dick had been in poor health for some time, he had seemed to be improving, as Burt reported in the November Review. Fitch, Ziegler and Lawley attended his funeral.

The Boston Herald carried the following news: "Herbert H. Howe, 71, for several years a consultant at the Massachusetts Income Tax Bureau, died [on December 13] at the Sturtevant Nursing Home, 1243 Beacon Street, after a long illness. Born in Mississippi, he came here as a child and attended Roxbury Latin and English high schools. He was graduated from . . . Technology and entered the bond investment business in Boston before his appointment to the bureau. He leaves a brother, William P. Howe of Brookline. . . ."

On the same day that Howe died, December 13, Newell J. Neall, VI, passed away. He had been living at 20 Brimmer Street and had recently been with the War Assets Administration. Ziegler and Allen attended services for both Neall and Howe; and Fred Lawley, the latter.

The Boston Globe printed an item of interest to us: ". . . Henry V. Hubbard, 72, former professor of regional planning and landscape architecture at Harvard, . . . died [on October 6] at his home, 15 Spofford Road (Milton) . . . Recognized nationally as an outstanding landscape architect and city planner, Mr. Hubbard was a member of the landscape firm of Olmsted Brothers, Brookline. He was born in Taunton and received his A.B. degree from Harvard in 1897. He was a student at M.I.T. in 1897 and 1898 and was awarded an S.B. degree in landscape architecture by Harvard in 1901." The article goes on to outline the various positions Hubbard had held and

the many honors he had received. Although he attended the Institute but one year, his affiliation was with the Class of 1900.

A letter from Fred Everett to Burt Cotting dated October 21 reads in part: "I am still doing business at the old stand (Concord, N. H.) in the highway department. I am, of course, old enough to retire and should do so, but I want to hold on for just a little longer to save up enough from my salary to attend the 50th anniversary of the Class of 1900. I haven't happened to run across any of the old gang for some time. I want very much, if possible, to get down to Boston and take in one of your occasional small group meetings."

We quote also a letter from Jouett dated November 25: "I noted the retirement of Stearns and Davis. I, too, am in that category, having been retired by the New York Central on September 30. So far as I know now, we shall continue to reside at the above address [11 Stoneleigh Road, Scarsdale, N. Y.]. Thus far I have kept myself very busy and expect to continue as my health is generally good, but I can't do all that I could do a few years ago. . . . I rarely see any 1900 men except Tuck, whom I see fairly often. He is well and busy."

Stanley Fitch, Fred Lawley, Charlie Leary, and Allen were guests of Joe Draper at the Algonquin Club for lunch on December 5. In lieu of a regular meeting of the Class and in spite of the protests of the writer, this self-appointed committee, backed by the solicitation of Charlie Smith and Percy Ziegler, appointed the undersigned secretary of the Class to succeed Burt Cotting until some more formal appointment can be made.

The chief duty of the Secretary seems to be to supply class notes for The Review. The material to enable him to do this must be provided by the members of the Class. We are sure that you all enjoy hearing from others through this medium. Then remember that others like to hear from you. Please, each one take this personally and drop a line to the Secretary telling something of yourself, your work, your hobbies, and whatever news you can give.

Since Burt took over the Secretary's job, his office has been a center for the Class, which will be greatly missed by those visiting Boston. Unfortunately, your new Secretary has no Boston office. His home, however, is in West Newton, and his telephone is Lasell 7-5387. Please call him up whenever you are in town. He will always be glad to hear from you. Several other members of the Class do have offices in Boston and invite you to call on them whenever you visit here. Among these are Stanley Fitch, 201 Devonshire Street; Joe Draper, 401 Summer Street; Charlie Leary, 44 School Street; and Percy Ziegler, Cherry-Burrell Corporation, Sullivan Square, Charlestown. Since the Secretary expects to be away from home quite a little during the next year, Stanley Fitch has kindly consented to act as Associate Secretary. —ELBERT G. ALLEN, Secretary, 54 Bonad Road, West Newton, Mass.

1901

The copy quoted below is from the July issue of the *Canadian Mining and Metallurgical Bulletin* reporting the conferment of

honorary membership in the Mining Society of Nova Scotia on Frederick Sexton: "Honorary Membership in the Mining Society of Nova Scotia was conferred on Dr. F. H. Sexton . . . at the luncheon held on the second day of the Annual Meeting of the Society, by the Hon. L. D. Currie, Provincial Minister of Mines, who introduced the recipient with the citation that follows:

"To be permitted to present the certificate of honorary membership of the Mining Society of Nova Scotia to Dr. F. H. Sexton . . . is an honour and a privilege that I appreciate deeply and sincerely. Dr. Sexton I have known in a personal way for many years. By reputation, I had known and heard of his fine qualities for a long time before it became my pleasure to meet him. As a member of government, it was to my profit and advantage to be associated with him, particularly in connection with the various branches of technical education for personnel during the war. Having known him as a friend and colleague for so many years, it is fitting at this time to give my opinion of him. I think he has one of the finest minds, one of the staunchest characters, one of the most lovable and gentle personalities, it has ever been my good fortune to know.

"An American by birth, a Canadian by adoption, a Nova Scotian by every attitude of his being, every throb of his heart, every sentiment that makes a man say 'This is my own, my native land,' he came to us in 1904 as Assistant Professor of mining engineering at Dalhousie University. Three years later he became President of the Nova Scotia Technical College, the first institution of its kind in Canada, and was also appointed Director of Technical Education. He established evening technical and coal-mining schools, corresponding courses, indentured apprenticeship schools. His work during and at the end of two World Wars in the courses he established in war emergency training and re-establishment of civilian workers will forever stand as a monument to a man of vision, capacity and energy.

Under his skillful guidance, the Nova Scotia Technical College trained engineers that are a credit to him wherever they are to be found in many parts of the world. For meritorious service, he was created Commander, Order of the British Empire. Never was honour so richly deserved. His contribution to the educational life of this country has been valuable beyond all estimation. His annual convocation addresses were always factual, original, thorough, and possessed an easy flow of simple, expressive language, a luminous arrangement of style and method that shed light on all the subjects with which he dealt. His annual reports to the Legislative Assembly displayed his fine perceptions, his sympathy and understanding; and the wide scope of his intellectual endowments are to be found on every page. They will form a useful part of the historical and governmental material of this Province. Administration of government will greatly miss this man who always trod the firm earth, this quiet yet fearless man who always sought practical truthfulness and always achieved impartiality of inquiry and judgment. To him and to the kind, gentle, charming woman, Mrs. Sex-

ton, who has been such a great source of inspiration and help to him, we wish happiness, health and longevity."

Roger Wight writes as follows: "I am still making my temporary home at 53 Park Street, Hudson, Mass., pending the finding of a suitable small apartment in Hartford, Conn., or elsewhere. As I think I wrote you, we sold our home at Cape Elizabeth, Maine, last September and most of our lures and penates are now in storage and may stay so for a while, as desirable small apartments are mighty scarce. I am finding retirement rather enjoyable but rather hope to work out a part-time job to fill in spare hours some of these days. Enclosed is a newspaper clipping about our classmate George T. Cross, whom I met several times in Worcester while I was secretary of '01. Those of us who are left must carry on heartily in anticipation of our 50th anniversary in 1951."

We regretfully include the account from the Boston Herald reporting the death of George Cross: "Capt. George I. Cross, 67, of 22 Trowbridge Road, [Worcester,] former assistant adjutant general of Massachusetts, died [on December 4] at the Chelsea Soldiers' Home. He was a former director of the Worcester Historical Society. A direct descendant of Gen. John Starr of Revolutionary fame, he was assistant professor of history at the U.S. Military Academy at West Point from 1925 to 1931. He was instructor of military history at the infantry school, Fort Benning, Ga., from 1923-1924 and before retiring from the Army in 1933 was in charge of education at Schofield Barracks, Hawaii, for two years. Capt. Cross attended Boston English High School and . . . Technology, and was graduated from Harvard in 1909. He was a high school and college instructor until entering the Army in 1917. He began his military career with Boston's First Corps Cadets and served with the 101st Engineer Regiment of the Yankee Division in France during World War I. He was assistant state adjutant general from 1920-1921, when he returned to the regular Army. He was a member of the Masons, Military Order of Officers of Foreign Wars, Rufus Putnam Memorial Association, the Harvard Club of Boston and the West Point Officers Club. He leaves three children, Brewster H. Cross and the Misses Carolyn I. and Susan W. Cross, all of this city."

We received the following letter from Al Higgins recently: "We spent a very pleasant five and a half weeks this summer in Maine at Sebasco Estates, and while we were there it was pleasant to find Roger Wight and his wife on hand for a week of our sojourn. I happened to buy a Portland Express, on September 13, which contained the enclosed article on hooked rugs with reference to our classmate Fred Freeman, who began this undertaking about 20 years ago. Apparently the business is now carried on by his daughter. I thought you might be interested to see the story.

"I don't know whether I wrote you or not, but they have wished on me this year the presidency of the M.I.T. Association of Central Florida. Although there are somewhat more than a hundred M.I.T. men in the territory, concentrated within a 75-mile radius of Tampa, it is rather a diffi-

cult job to get more than 20 of them for any meeting; but we were expecting Harold Lobdell '17 to address us at our first fall meeting on the seventh of November and that this might prove helpful and productive in getting out a few more than usual. I have neither heard nor seen any classmates recently, and I only wish that more of them could let you know of their present status and activities so that each of us could follow a little more closely the other fellow's doings.

"Last June I made a special trip to Boston to attend my 50th Newton high school class reunion, which was held at the Brae Burn Country Club, and it was one of the most enjoyable gatherings that I have ever attended. I hope I may be privileged to enjoy many more, if they continue to have them. At that meeting it was most interesting to see Clarence Brown, whom I had not met in more than 40 years. Several of the other Newton high school boys who went to Tech were in our Class, but for one reason or another were unable to come. If you get down this way this winter, be sure to let me know in advance, so that we may be of some help to you, if possible. I am looking forward to Ed Seaver's return to Clearwater, which seems now to be part of his regular yearly routine."

A card from Willard Dow states that he and George R. Young announce their association to continue the practice of public accounting as partners under the firm name of Dow and Young, certified public accountants, at 131 State Street, Boston. — GUY C. PETERSON, Secretary, 788 Riverside Drive, New York 32, N. Y. THEODORE H. LAFT, Assistant Secretary, Room 3-266, M.I.T., Cambridge 39, Mass.

1902

It is with regret that announcement is made of the death of Cecil B. Annett on December 7. According to word received from James McGowan, Jr., '08, President of the Campbell Soup Company, of which Annett had been treasurer for some years, Cecil's death was very sudden. He was visiting his son, Cecil, also a resident of Moorestown, N. J., and had seemed in good health and spirits upon retiring. In the morning Mrs. Annett called him, but he did not respond. The physician summoned stated that Cecil had died in his sleep from a heart attack.

The following obituary was furnished by Mr. McGowan: "Cecil B. Annett of 310 East Central Avenue, retired treasurer of Campbell Soup Company and civic leader, died suddenly early on the morning of December 7 at the age of 68. Born in East Jaffrey, N. H., he attended Murdock High School, Winchendon, Mass., and . . . Technology in the Class of 1902. Mr. Annett's early business years were spent with the Gunn Richards Company, business engineers of New York City. In 1915, he joined the Campbell Soup organization. He occupied important executive posts with that Company and became treasurer on May 23, 1939. After retirement from active service with the Company on December 31, 1945, he continued to serve it in the capacity of special consultant.

"Mr. Annett had wide civic interests in Moorestown. He was president of the

Moorestown Improvement Association and chairman of the recreation commission for many years and also served on a number of other civic committees. He was one of the members of the committee appointed to develop a zoning ordinance for Moorestown. In addition, he was active in work of the Burlington County Boy Scouts of America and was recipient of the Scouts' highest honor. He maintained a summer home, 'Green Hill,' at Cohasset, Mass., and was a member of the Riverton Country Club, the Cohasset Golf Club, and the M.I.T. Club of Philadelphia.

"Mr. Annett's parents were Thomas Annett of Fredericton, New Brunswick, and Mary Helen Bancroft of New Ipswich, N.H. He was named for his uncle, Dr. Cecil F. T. Bancroft, who was for many years headmaster of Phillips Academy at Andover, Mass. On September 17, 1914, he married Helen Wallace Arnold of Abington, Mass. He leaves his wife; two children, Cecil B. Annett, Jr., of Moorestown and Mrs. George Taylor of Auburn, N.Y.; four grandchildren; two sisters, Mrs. Lewis Davis, Miss Marietta Annett; and a brother, Arthur Annett, all of Claremont, N.H."—BURTON G. PHILBRICK, Secretary, 246 Stuart Street, Boston 16, Mass.

1903

From the Alumni Office we have received notices of the deaths of Mrs. Bayard R. Frazier (Eva Loring Feltis), in Pittsfield, Mass., in 1945, and of John S. Bridges, Jr., in Baltimore, Md., last May. Mrs. Frazier was a member of Course IV and was with the General Electric Company. Bridges will be remembered by all of us who took military science, as the commander of the battalion in our freshman year. At the time of his death he was president of Coale Muffler and Safety Valve Company.

W. E. Mitchell, former President of the Georgia Power Company, addressed the public utilities section of the National Safety Council on accident prevention, using the slogan "engineering, education, and enforcement," as a backbone for such prevention.—A. H. Hepburn, IV, was the designer of the new U.S.F. Constitution stamp. Philatelists owe him a rising vote of thanks for turning out a really artistic and beautifully designed stamp, by far the best we have had in many issues.

Our Class has come to the time of many retirements, apparently, as we have received several notices of changes of address, among them being Frank G. Cox to Miami, Fla., and Frank B. Jewett to Short Hills, N.J. Also your Assistant Secretary has moved to South Wellfleet, Mass., where he hopes that any of you who spend your vacations on Cape Cod will find him. He is on the main road, near the South Wellfleet post office.—FREDERIC A. EUSTIS, Secretary, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, Assistant Secretary, Box 103, South Wellfleet, Mass.

1905

Casting through the new Alumni Directory, we find the following classmates officiating in various capacities. Pete Harvey is a term member of the Corporation. Ed Barrier is chairman, and Frank Carhart a member, of the committee on the Tech-

nology war record. Ed also represents the Detroit M.I.T. Association on the Alumni Council, and, of course, Grafton Perkins is still class agent (plug for the Alumni Fund). Charlie Johnston is honorary secretary at Norfolk, Va., and, as we all know, Bob McLean is our class representative on the Council.

Frank Chesterman was on November 1 elevated to the presidency of the Bell Telephone Company of Pennsylvania. Congratulations, Frank. In the latest report of President Compton we learn that Professor Lewis is chairman of the Committee on Educational Survey; also that Waldo V. Lyon was recently retired with the rank of professor emeritus. Hub Kenway's firm, Kenway and Witter, has merged with Jenney and Hildreth under the name of Kenway, Jenney, Witter and Hildreth, with sumptuous offices at 24 School Street, Boston. Hub's son, Herbert P., after several years in the Navy, is also a member of the firm.

Roy Walker's son Alden was married in October to Patricia Harbach in Philadelphia. Roy writes that, having purchased an old run-down farm in northern Pennsylvania about two years ago and thoroughly remodeled it, he has sold it and is now in the market for more farms to conquer, on the side of course, as he still holds his position with the Lanston Monotype Machine Company. We have received four more reprints from the Bureau of Mines "Minerals Yearbook" of 1946, entitled "Phosphate Rock," "Talc and Prophyllite," "Potash and Nitrogen Compounds," by Bertrand L. Johnson et al. Our library on minerals is quite extensive should any of you miners wish to consult it.

Recently, in an attempt to gather news for The Review, I wrote about 60 letters to classmates not heard from for some time, asking for a story. I must be a poor sales-promotional man, for I received just one answer (1.67 per cent returns), namely from Joe Daniels, and here it is: "Perhaps if I begin by saying that I am rounding out 36 years of service in my present job, I shall have a starting point. I believe I have nearly as much enthusiasm in my job as I had when I arrived in Seattle; at any rate I still keep up with the procession, my contacts with young people keep me youthful in spirit, and I like my surroundings. All my children have attended here at the University of Washington I; my youngest is now a freshman. We had three girls and one son but lost the latter four years ago as a war casualty.

"Just now the University is a busy place; we have 16,000 students and the usual cluttering of shacks and temporary housing facilities for the returned veterans and others. Fortunately, the last Legislature was good to us, and we are spending 16 million dollars for new structures. When these are finished, we shall have caught up with a delayed program and have sufficient space for normal, expected registration.

"I have served on the M.I.T. scholarship committee for several years. Quite a few boys go from Seattle, and we interview the promising candidates for the regional and freshman scholarships. It has been an exceedingly interesting experience. Besides these men, quite a few Washington gradu-

ates go on to M.I.T. Once in a blue moon we see a member of the admissions board, and we have rare visits such as those of Sam Prescott '94, Lobby Lobdell '17, the crew and its coaches, and R. T. Jope '28. Very rarely do I see a classmate. Some while ago Norman Lombard dropped in, but I was out of the city at the time.

"I haven't told you much about my immediate family, for I don't feel that these items mean much in cold print. When a group gets together at a reunion, one can produce photographs and brag. However, I'll say that I have three very interesting young grandchildren, the oldest nearly five. Since my wife is an enthusiastic and skilled 'nursery man,' we have a fairly good garden. Unfortunately, I am the guy who has to do the digging, weeding, and watering, though I get little credit for the fine showing of flowers, plants, and other growths. I have learned not to pull up weeds only to discover that they were rare and unusual plantings. Maybe, some day, when I get ready to retire, I shall get a small plot of ground and do some growing on my own hook. In fact, I have picked out a place overlooking a marsh on an arm of Puget Sound, where the soil is fair and the view always beautiful; there is a clam bed not too far away; good fishing may be had at some seasons of the year and a deer or two if one wishes to shoot. The surroundings are fairly primitive, even down to the local citizenry. If you've read *The Egg and I*, you'll know what I mean. However, I don't intend to go to this spot for some years, as I still like my job and my Seattle environment.

"Well, there you have a sort of pre-obituary notice. 'If this be treason, make the most of it.' My good regards to you and to any others who may be encountered."

It is a matter of regret that we cannot send you a reprint of a section of the Boston Post of November 2, which contained a mighty interesting story of Sid Strickland's work (or fun) in excavating around Plymouth, Mass., in search of colonial relics. That he has been eminently successful is shown by the comment of the writer (John H. Cutter): "The museum of artifacts in the cellar of Sidney T. Strickland, the celebrated architect who designed Boston's Ritz-Carlton Hotel, is in some respects the most fascinating in New England. There I saw handmade bricks with the imprint of a turkey's foot and a wolf's paw plain to be seen among them. Those bricks were made by some of the *Mayflower* passengers, according to the evidence." And for the benefit of those who have not seen Sid for some time we quote again: "Mr. Strickland, who is a handsome and extremely distinguished gentleman in his early sixties," and so forth. To prove the above, the article contains two pictures of Sid at his work. We are endeavoring to get reprints for general distribution; if unsuccessful, we will preserve the one we have in the class album, where it will be available to classmates attending future reunions. In case you go through Plymouth, Sid's is a "sea-gray" house on Leyden Street, built in 1732. You'll be well rewarded.

Recently a member of the Class suggested that it would be nice to read something except obituaries in the class notes.

In rejoinder, we might mention that in spite of the attempts of a series of hard-working secretaries, the only news we have received from many members has been in the form of obituaries, clipped from a newspaper; secondly, we can't prevent classmates from dying. So here we go again.

Dan Adams, II, a director and chief power, heating, and ventilating engineer of Lockwood Greene Engineers, Inc., at 10 Rockefeller Plaza, New York City, died on November 29 at the New York Hospital. Upon graduation from M.I.T. he went to the Pacific Mills in Lawrence, Mass., leaving there in 1912 as plant engineer to join Lockwood-Greene in Boston, later being transferred to the New York office. Among the buildings for which he designed power, heating, and ventilating systems were those of the Pacific Mills at Lyman, S. C., the Libbey-Owens-Ford Glass Company in Detroit, the International House at the University of Paris, the Rahway, N. J., and Elkton, Va., plants of the Merck (Pharmaceutical) Company, the New York *Herald Tribune*, and the U.S. Rubber Company in Detroit. He was associated with the Plaskon Division in the development of synthetic resins, also with the Libbey-Owens-Ford Company in the development of plate and laminated glass. Surviving are his wife and two married daughters.

Earl Gordon Bill, dean emeritus of Dartmouth College, died on November 28 from a self-inflicted bullet wound after a long illness. Gordon was with us until 1904, when he entered the senior class at Yale, taking an M.A. in 1906 and a Ph.D. in 1908. He received a Phi Beta Kappa and Sigma Chi key and a \$400 prize at Yale. He tutored, taught in the Sheffield Scientific School, studied in Europe, taught at Purdue, and in 1911 went to Dartmouth as assistant professor. He was the first to hold the office of dean of the faculty (in 1933) and retired in 1947 as dean emeritus. In World War I, the Canadian Department of Justice secured for him a leave of absence from Dartmouth and placed him in charge of the draft. Surviving, besides his widow, are a married daughter and two sons, Andrew C. Bill, a teacher at Deerfield Academy, and John C. Bill, a graduate student at the University of Rochester.

Phelps Wyman, IV, died in Milwaukee, Wis., on November 16, at the age of 78. He received his B.S. in Agriculture at Cornell in 1897 and took special courses with us between 1902 and 1904. In 1905, he opened an office in Minneapolis as landscape architect and was a commissioner of that city's board of park commissioners from 1917 to 1924 as well as a member of the Minneapolis city planning board from 1922 to 1924. Wyman conceived the idea of the Milwaukee Citizens Lakefront Committee and was its secretary for many years. —FRED W. GOLDTHWAIT, Secretary, 274 Franklin Street, Boston 10, Mass., SIDNEY T. STRICKLAND, Assistant Secretary, 69 Newbury Street, Boston 16, Mass.

1907

In the December 1st issue of *Time*, on page 44, is an excellent picture of Clarence Howe, which appears in connection with an article telling of the plans for making

the Dominion of Canada more highly industrialized. The following is quoted: "To expand this industrial economy the government granted sweeping powers to Reconstruction Minister Clarence Decatur Howe, a 61-year-old, United States-born engineer who bossed Dominion industry during the war. As economic czar Howe can grant permits for the importation of manufacturing machinery. He will be able to force Canadian branch plants of United States companies (there are 2,000 of them in Canada) to stop importing parts, begin making their own with Canadian raw materials. He will be able to shut any plant that does not co-operate. He will have the power to step up exploitation of Canadian resources. Gold mines, for example, will get a \$7 an ounce subsidy for every ounce they produce over their output in the twelve months ending last June 30. Coal production will be stimulated. Under Minister Howe, Canada hopes to build more paper mills, make high grade paper stocks at home instead of sending wood pulp to the United States to be processed."

I have messages from our two MacGregors. Frank wrote me on December 15, saying: "I have decided that 40 years — 1907 to 1947 — is about enough time to put in, and I am going to retire from business on January 1. It is no use waiting until health or age cause retirement. I might as well do it while in good shape. As for my plans, I expect to continue to live here at 2307 Ridgeway Road, Wilmington, Del., and spend such time as I want at my place in Maryland." Frank's whole life has been spent with the Du Pont people, where for the past several years he has been general manager of their electrochemical department. A loyal M.I.T. and '07 man, a credit to both in every way, he has our best wishes for long-continued health and happiness. —Milton MacGregor wrote me also on December 15, enclosing two pictures of Frank MacGregor and John Bradley that he took at our 40-year reunion last June to add to our class archives. M. E. said: "I have been very busy with the garden and cranberries. I am having the time of my life, out in the open daily and working hard physically a good deal. This is more to my liking than indoor mental work." Mac has been living at "Silvermead," Lower Road, Brewster, Mass. (on Cape Cod), since his retirement from being a teacher and master in Boston high schools. —BRYANT NICHOLS, Secretary, 23 Leland Road, Whitinsville, Mass. HAROLD S. WILSON, Assistant Secretary, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

In the November Review we spoke of the visit of George Wallis and Marcia to the Isle of Springs, Maine, and stated that they were returning from a fishing expedition to Canada. George has been kind enough to describe more completely the trip which they took during the summer. "As usual, Marcia and I spent considerable time this summer at our place in Wenham, Mass. During August we took a trip into the Laurentides, north of Quebec, to enjoy the scenery and a little fishing. This area is covered by timber and dotted with beauti-

ful lakes. We caught plenty of speckled lake trout, which furnished the principal item of our meals back at camp. We left through the north end of the Laurentides and motored down along the Saguenay River, ferrying the St. Lawrence at St. Simeon. Crossing over into Maine, we drove down through Aroostook County and finally along the shore to Boothbay Harbor, where we dropped in to see Muriel and Chet Dawes. They met us on the mainland by speedboat and took us over to the Isle of Springs, where their attractive cottage is located, high upon a hill overlooking the Sheepscot River with its numerous islands. Chet is not bothered by automobile traffic as he spends most of his time traveling in his cabin cruiser or the speedboat. After a boat ride to secure the lobsters and a visit to the yacht club, we returned for a delightful lunch, leaving shortly thereafter to complete our journey to Wenham."

Paul had the good fortune to attend the dinner given in honor of President and Mrs. Compton by the M.I.T. Club of New York, and his description of the occasion is as follows: "Back along when I first came to New York, it was the Technology Club of New York. Just recently the Club changed the name to M.I.T. Club of New York. But a rose by any other name would be just as sweet, and I can assure you that on the evening of December 9 the Club burst again into full bloom with a dinner at the Biltmore with almost 600 attending. I can recall no more festive Technology affair for these many years. The dinner very appropriately was in honor of Dr. and Mrs. Compton, and everyone, I am sure, had a swell time. Our Class, as usual, was well represented. There were 11 at the 1909 table: Harold, I, and Mrs. Ballard, Claude, I, and Mrs. Wilson, Chauncey, I, and Mrs. Crawford, Paul, III, and Mrs. Lord, Mex, II, and Mrs. Weill, and your Secretary. Up on the dais with the Comptons, the Swopes, and the Sloans, were Tom, I, and Alice Desmond both of whom seemed to me to be enjoying every blessed moment of the party. As Dr. Compton was speaking, again for the millionth time I was thanking Heaven that we had him for our president. To me, he appeals more every time I see and hear him. I had as my guests the Paul Lords. I had not seen Paul since graduation. He had recently gotten in touch with me casually, and since he and Betty were in town, I asked them to come with me. Paul is from Boston and he has been in El Paso, Texas, almost the whole time since graduation. I have been in Dallas, in eastern Texas, and I heard then that El Paso was as far from Dallas as New York is from Chicago! And my native Rhode Island is so small that it would take some 250 Little Rhody's to equal the area of Texas. Paul has been with the American Smelting and Refining Company all these years. He has charge of mining properties across the Rio Grande in Mexico. He is here on company affairs with Mrs. Lord and to spend Christmas with his two daughters, one in Baltimore and one in a New York suburb. Maybe it is because we are both Pauls, but I tell the Texas Paul that for the Rhode Island Paul this is the beginning of a beautiful friendship. I even threaten some day to go to El Paso to see the Lords on the

banks of the Rio Grande and from there look across for my first sight of Mexico.

The duties of class secretaries would be greatly lightened if we had more members like Tom Desmond, I, for he is always so active doing something constructive and for the good of his fellow men that nearly every month there's lots to tell about him. Also the news does not come from Tom himself, but like Will Rogers "all we know is what we see in the papers."

The first item is of considerable personal import to the Review Secretary, for Tom, who was also Harvard '08, has been appointed a member of the committee of the board of overseers of Harvard University to visit the Graduate School of Engineering, where the Review Secretary holds forth. The committee inspects the school at least once annually and makes a report to the overseers on its general condition, with any recommendations which it wishes to make. In November, however, Tom made a visit on his own to the school before the usual formal visit of his committee, so as to have ample opportunity to learn at first hand the situation and condition there. Our faculty, also, had luncheon with Tom, and we had the pleasure of an informal discussion, in which he advanced several constructive ideas on what engineers should strive to become and what a school should do to prepare students better for engineering responsibilities. Tom, also being a life member of the Corporation of the Institute and chairman of the committee which similarly visits the Civil Engineering Department at the Institute, suggested means whereby the two schools might co-operate in many directions and at the same time each might concentrate on different specializations so as to avoid duplication of effort. Our faculty was very favorably impressed with Tom and his ideas, and it feels that his presence on the committee is certain to lead to many constructive recommendations.

On November 4, Governor Dewey appointed Tom as a member of the newly created New York Food Commission. Many of you will recall that for a long time Tom has taken an active part in the matter of food and nourishment for the people, and particularly for the children of New York State.

In the New York Sun of Tuesday, December 2, Tom was the subject of a prominent editorial, which we quote in part as follows: "State Senator Thomas C. Desmond has announced his entry into the legislative lists as a champion of traffic relief. He says that in the forthcoming session he will introduce five bills, one aimed directly at New York City and the others of statewide application. One bill would authorize the Port of New York Authority to construct or lease parking garages, including one to serve the new Madison Square Garden near Columbus Circle, a proposal on which the last legislature failed to act. The others would require future factories, hotels, office buildings, and similar structures, described by the Senator as 'traffic generators,' to furnish off-street parking space unless specifically exempted by local ordinance; would authorize cities to make tax concessions on present buildings which might be altered to provide off-street parking or loading facilities; would em-

power municipalities to condemn property and allocate funds to construct trucking depots; and would create a State Traffic Commission which could employ experts to advise cities on traffic problems.

"These are interesting suggestions and recognize a problem plaguing not alone New York City but most of the municipalities of the state, among them, undoubtedly, the Senator's home community, Newburgh. Everywhere the question of traffic control is more pressing, and it is well that legislators already are giving thought to doing something about it."

We have received a notice from H. B. Kane, Director of the Alumni Fund, stating that a certain number of requests for back numbers of "Technique" are continually being made by Alumni. As a result, he has asked the Technique management to look over their stock and finds that a limited number of requests for back numbers can be filled. Among these are those of 1908, 1909, 1910. All numbers are sold for \$4.00 each and may be obtained by writing directly to Technique, Walker Memorial, M.I.T., Cambridge 39, Mass. — PAUL M. WISWALL, Secretary, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, Review Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass. Assistant Secretaries: MAURICE R. SCHARFF, 285 Madison Avenue, New York, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1911

There were 52 of us — 27 classmates, 23 wives, and two juniors — at the Essex House in Newark, N.J., on the evening of December 4 to greet our four-star General George Kenney, II, who was guest of honor on ladies' night, the fall dinner meeting of the M.I.T. Club of Northern New Jersey. The Club President, Frank Pierson '29, Class President, Don Stevens, II, program chairman, Livingston Ferris, VI, and I met George at the Newark Airport, as he flew in just before 4:30 in his B-17 from Dayton, Ohio. We escorted him to the hotel, where later our wives joined us for a fine talkfest with our illustrious classmate.

President Pierson and his wife, General George, and Sara and I later formed a reception line preceding the dinner, the total attendance being more than 150. Special tables were reserved for the 1911 delegation and Don led the '11 cheers, and I officiated from the piano for a number of Tech songs during the enjoyable evening's entertainment, with Liv Ferris introducing George to the assembly. Speaking on the subject "Modern Air Power for National Defense," George covered a lot of ground in his own inimitable way and stressed the importance of developing commercial aviation bases in the northeast section and particularly in New England, for these states, he said, "must realize their position is an exposed one."

War-time chief of the Allied Pacific Air Command and now commanding general of the Strategic Air Force Command, George said that in case of an air attack on the United States "fighter planes would be rushed into New England from every section of the country to make interceptions as far from industrial areas as possible."

In calling for greater development of commercial fields in the New England states, George pointed out that in wartime they would afford protection not only to New England but to everything south and as far west as Chicago. "The mere fact that the flying routes across the Atlantic are over New England should make those states, in time of war," he said, "routes of invasion, because routes of invasion follow commercial routes." Generous applause greeted George as he drove home point after point about the fine development of the Air Forces, particularly since the merger bill, and it was certainly reassuring to learn from a top man how well prepared we are for any possible emergency. He also held us spellbound as he told of his latest flight around the world with stops at strategic air bases everywhere.

Sam Cornell, XIII, Bill Orchard, XI, Johnnie Scoville, IV, and Ralph Walker, IV, were the stags present from our Class, the following classmates being accompanied by their wives: Royal Barton, Dennie Denison, Liv Ferris, Joe Harrington, Norm Lougee, Bill Martin, Bob Morse, and Walter Welch, VI; Phil Caldwell, Jim Campbell, Mert Hopkins, Will Stamper, Vic Willis, and Erv Young, I; Silas Ratzkoff, Nat Seeley, and Don Stevens, II; Dick Ranger and Bob Wood, VIII; Lester Cushman, IV; Cleon Johnson, X; Sellie Seligman, III; and Harry Tisdale, V. The Ferrises and Stammers each had their daughter with them to complete the deck (52).

Bob Haslam, X, unable to attend, wired greetings to all, and our wartime rear admiral, Luis deFlores telephoned his sincere regrets at his inability to attend. We had invited our brigadier general, Syd Spalding, III, now attached to the Munitions Board National Military Establishment in Washington, to fly over, if possible, and he wrote, "Nothing would please me more, but right now it's quite impossible for me to leave Washington."

Liv Ferris deserves a great deal of credit for a finely planned and well executed party, and Don Stevens helped a lot in rounding up 1911 to greet George, the net result being the largest class gathering outside of a five-year reunion. We certainly missed our vice-president, Howard Williams, XI, who was away on a business trip for his advertising firm — Erwin, Wasey and Company of New York. Eleven days later the 1911 fund total zoomed from a little below \$2,800 to a little below \$5,300 — 187 per cent of our class quota, thanks to Zekel.

The 1911 table at the New York Tech Club dinner held at the Biltmore on December 9 to honor Dr. and Mrs. Compton seated 12, as follows: Barbara and Phil Caldwell, Antoinette and Jim Campbell, Anna and Dick Gould, Grace and Harry Tisdale, Grace and Walter Welch, and Don Stevens and his mother, Mrs. Harriet R. Stevens. Don writes that he had a chat with Dr. Compton that evening continuing their exchange of correspondence concerning Federal support of higher education; the President assured him he welcomed such debate, adding that The Review belongs to the Alumni. Don and I had discussed the matter en route to the Newark Airport to meet George Kenney and agreed that it

would be interesting to see how classmates feel on the issue of government subsidy.

Don had written Dr. Compton on October 30 as follows: "It is with regret that I had to read your argument for Federal support of higher education on Pages 8 and 9 of your President's Report for 1947. . . . It is easy for me to realize how difficult it is for you to find the large operating funds that you need in this day and age when taxation is apparently cutting down the number of large estates and rich people who might give large sums. Still, I do not feel that the remedy for this situation lies in future impoverishment of the nation and its people in behalf of higher education with the many other social movements that are demanding government support. . . . Governmental control of higher education seems very inadvisable. It may be that your thought on Pages 8 and 9 was put forward in the nature of a 'trial balloon'—if so, you have my reply as the reaction from one Alumnus who maintains the highest regard for you and your ability."

Receiving assurance that Dr. Compton believes that "larger Federal and state support of higher education appears to be advisable at this time, since many worthy individuals are unable to afford higher education," Don wrote again in mid-November: "It will always be true that 'many worthy individuals are unable to afford higher education' no matter how much money you raise and whether it is raised by private or Federal donation. I am not impressed with the idea that worthy individuals will become any more brilliant by receiving an educational handout. I do not want to see our nation go any farther along the road of regimentation. Most certainly I do not want to see M.I.T. lead in that direction, for where M.I.T. leads, others will follow. Technology should not take the course of least resistance." Don is eager to know how other classmates have reacted—address him at Okonite, 730 21st Avenue, Paterson, N. J.

Under the firm name of Edward R. Hall and Vanderpoorten, Ned Hall, II, has established a technical service at 112 High Street, Newburyport, Mass., with a Belgian office at 33, Rue Alsace Lorraine, Brussels. Ned had hoped to get to our "Seven Come Eleven" party at Walker Memorial but was unable at the last minute to get back from New York in time. "As for my business," he writes, "since I made excellent connections in Europe during and immediately after the war (being in charge of Engineer procurement throughout Europe, outside Germany), it seemed probable that I could capitalize upon my acquaintance with European firms and their directors. With a Belgian partner, I have therefore started an export-import business. We have the United States exclusive for a Swiss paper mill making the finest drawing and water-color paper in the world (better than the Whatman product that we knew at Tech, which has been pretty much a world standard for this type of paper).

"We are doing importing of an increasing amount of Belgian linens, having visited and made the acquaintance of the heads of 90 per cent of the Belgian mills. We are exporting the handy cans of lighter fuel, a small item, but one that is moving well.

We have recently been fortunate enough to prevail upon the Wayne Equipment Company of Fort Wayne, Ind., to give us Europe exclusive for their complete line. This latter proposition will be slow in starting because of the current shortage of dollar exchange in the European countries, but the demand is huge, and with our policy of carefully selecting our national distributors and dealers and assisting them to train their installation and service crews in American methods and to American standards of efficiency and safety, we hope and expect to develop a high prestige for the Wayne line on the Continent. The deal that delayed me in New York is one that is just being written up now, after several months of work, and is for the supply to Argentina of 100,000 metric tons of Portland cement from the Belgian mills from which I bought a similar amount for the Engineers in 1945, most of it going into the construction of Orly Field, near Paris. They say that 'when Greek meets Greek, then comes the tug-of-war,' but you should try to reconcile the viewpoints of the Continental Belgians and the Latin Argentinians!

"It has been a mighty interesting 15 months since I left active duty (four years of it, two and one-half in Washington with the Chief of Engineers, and one and one-half in the European theater with the chief theater engineer) and has taken lots of hard work and persistence, with discouragement pretty heavy at times and large expenses, but the sun is beginning to shine again, and we believe that we are at last on the upgrade. It looks now as if I should be going back to Europe around Christmastime for several months, overseeing the shipments of cement and the development of our markets for the Wayne products, so I'm afraid that I shall miss the mid-winter assembly, too. However, I'll make it one of these days, and in the meantime please give my best regards to those of the gang whom you meet, and to you my very best wishes."

Beardsley Lawrence, I, and his wife have given up their apartment in New York City and are now located on Oxbow Road in South Lincoln, Mass., where B. is slowly but surely recovering from a series of operations at a Boston hospital. "I had another session in the hospital this fall," he writes, "and am now only beginning to get on my feet again for a few minutes each day. I have reason to believe that this time my recovery will be more permanent, although it will be some time yet before I shall be really back in circulation. This present address will hold good until such time as it may take for me to be up and about again, but in any event we expect to stay somewhere around Boston."

The eighth annual Old Timers' Dinner, sponsored by the Concord, N.H., Railroad Y.M.C.A., for retired employees and members of the association, was held in the late fall with 69 veteran railroad men present. Paul Pearson, II, general agent at Concord and president of the "Y" board of directors, presided and welcomed the veterans. I met Burleigh Cheney and Jack Herlihy at the New England Conference at the Statler in November.

Christmas cards from classmates are arriving daily and are a joy to Sara and me. One from Paul and Otilie Cushman was

postmarked Oklahoma City and, sure enough, a note inside indicated that on December 5 they had settled there after a number of years in Valparaiso, Ind. "We have moved here unexpectedly, but permanently," Otilie writes, "for, on December 5, Paul took a position as chief engineer and metallurgist with the L. and S. Bearing Company here — Box 1072, 1015 North Broadway, Oklahoma City, Okla. He had an article in the *Iron Age* for November 27 on bearings, which he hopes has not been mutilated before publication." Good luck in your new work, Paul.

Just before completion of these notes, word has reached me that Julian Gravely, V, died on November 10, but no details are as yet available. He had lived for some years at Hill Top Farm, Stony Creek Mills, Pa., and had always taken a keen interest in class affairs. A native of Henry County, Va., he entered M.I.T. as a transfer student from Washington and Lee University and during his time with us became a good Tech man. We regret his passing.

A pair of address changes to close: James J. A. Gannon, III, 40 Galen Street, Walham 54, Mass.; Lester A. Stover, II, 4644 Colfax Avenue South, Minneapolis, Minn. Don't forget to "Write to Denniel" — ORVILLE B. DENISON, Secretary, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, Assistant Secretary, 588 Riverside Avenue, Medford 55, Mass.

1912

John D. Shore, IV, writes as follows from West Roxbury, Mass.: "We certainly did have an excellent reunion and a grand turnout, one of the milestones in our lives. Mrs. Shore and I took a year off from work and traveled through the South. Our son, Robert, has entered the University of Michigan, studying to become an industrial engineer (the newest craze). Our daughter, Else, was graduated from Radcliffe in 1943 and is married. Her husband, Louis Weinberg, is an instructor at M.I.T. He is an electronics expert in the Electrical Engineering Department. I have been spending a great deal of my spare time on rare books—specializing in those on navigation and geography and on maps and logs going back to the Fifteenth Century." Thanks, Jack, for your interesting news as well as for your good example.

On October 28, the News of Newport, R.I., contained the following item: "A full-dress parade of troops stationed at Fort Adams was held today in honor of Colonel Harold C. Mabbott, C.A.C., commanding officer of Fort Rodman at New Bedford and executive officer to Colonel Earl H. Metzger, commanding the harbor defences, upon the occasion of Colonel Mabbott's retirement. . . . A reception for Colonel and Mrs. Mabbott and daughter Ann was held at the Officers' Club. They will make their home in Swarthmore, Pa. Colonel Mabbott was born in Kentucky in 1890 and is a veteran of both World Wars, having served in the European Theater in World War II. He holds the Bronze Star Medal. A graduate of . . . Technology in 1912, he was commissioned a first lieutenant in 1917." Mabbott's impending retirement was previously reported, but we were very glad to have news of the honors which accompanied the ac-

tual event. We extend best wishes to the Mabbotts in their new home in Swarthmore.

In a short note, Harold G. Manning, X, of Waterbury says: "In regard to my activities, I am keeping very busy working six days a week at my patent law practice, playing golf, and taking trips to New York, Washington, and elsewhere! You might be interested to know that I had lunch with Aksel Pedersen, X, at the Willard in Washington on September 30 to talk over the class reunion and other matters. Here's to a bigger and better reunion in 1952!"

The following letter from Nicholas T. McNeil, I, which was forwarded by Albion R. Davis, contains just the sort of personal information which everyone likes to see in the class notes: "I recently came across your Alumni Fund notice, and as we are approaching the 'sere and yellow leaf' as Shakespeare said, I thought I would drop a line and inform you that after 10 years as a civil and mechanical engineer with the Boston and Maine, Boston and Albany, the Bay State Street Railway, and the United Shoe Machinery Corporation (where Harry Benson is now located), I have spent a quarter of a century educating adolescents in the Salem high school. I have also been supervising the evening schools, where we explain the American form of government and teach the complexities of the English language to students of a dozen different nationalities. The work is extremely interesting because of the gratitude of the pupils. I have a son, a Jesuit priest, now teaching at Holy Cross, a daughter teaching in the Lynn Schools and another daughter married to an F.B.I. agent, who has given me a grandson."

Mrs. Charles L. Tuller writes from Royal Oak, Mich., to Mrs. White: "I am enclosing a check for your husband; mine will 'mean' to send it and won't get it sent. And we do want to see the rest of the pictures. I shall have to leave THE REVIEW news to Charles, who has been busy as usual helping to keep the Ford Motor Company going in spite of strikes and threatened ones." How about more news from the wives if the husbands do not write?

Watch this space in later issues of The Review. It will feature a story about you, if you will only send in the story. Do it now! — FREDERICK J. SHEPARD, JR., Secretary, 125 Walnut Street, Watertown 72, Mass. LESTER M. WHITE, Assistant Secretary, 4520 Lewiston Road, Niagara Falls, N.Y.

1913

Things are cooking for our 35th reunion, which will run for three days, beginning on Friday, June 11. Ten years ago, at the Commander Hotel in Cambridge, we had the largest attendance by far of any previous 25th year class reunion. At that time we agreed that our party was successful in something like geometric proportion to the number of persons who came to it. So, again we hope to have a good-sized crowd. The year 1938, you remember, was during the depression; hence we had no trouble at all about accommodations in Cambridge. This year the situation is entirely different; greater Boston hotels haven't much to offer, and we may have to go to a near-by resort at some sacrifice in attendance. This is really the only problem of our reunion committee,

and only those of you who know by this time that (1) you will, or (2) you probably will, attend can help the committee to make the best solution possible. If you haven't answered my letter, sent to every member of the Class in January, will you please answer this call?

It's too bad Al Jones of Quincy won't be with us in June. Al was a regular attendant at all class dinners in Boston in the middle Thirties, and we enjoyed his likeable, friendly personality. The Boston Herald printed in the November 23 issue the following: "A large sailfish, weighing more than 97 pounds, and caught off the Philippine Islands, is the latest record set by the popular Major General Albert M. Jones of Quincy, head of the United States Military Advisory Group to the Philippine Republic, heroic commander of Bataan, when lack of food and medical supplies forced him to surrender his corps to the Japs on April 9, 1942. At that time, stripped of everything but the clothes on his back, he was forced to lead a column of American prisoners of war in the infamous 'Death March.' He was in charge of about 4,500 American prisoners of war in the West Camp at Camp O'Donnell, where thousands of American and Filipino prisoners of war died of dysentery, malaria and other diseases.

"Now in charge of the U.S. military advisory group in the Philippines, he is a contrast to most men of importance and high government position. An humble and polite man, when asked about his new work, he simply smiles and says, 'It's a quiet job, except for the election periods.' One of the most famous and most decorated generals of World War II to come from Massachusetts, Major General Jones has the following decorations: Distinguished Service Cross, Distinguished Service Medal, Silver Star and Oak Leaf Cluster, Bronze Star Medal with Oak Leaf Cluster, Army Commendation Ribbon. He holds the Philippine Distinguished Conduct Star and the Distinguished Service Star. He is also entitled to wear the Distinguished Unit Badge with three Oak Leaf Clusters. . . .

"Born in Quincy on July 20, 1890, he is a graduate of Quincy High School and Thayer Academy. His military career began when he enlisted as a private in the First Signal Company of the Massachusetts National Guard in March, 1909. He was a junior at . . . Technology when he was commissioned a second lieutenant in the regular army on October 7, 1911, and has served continuously as an officer since that time. His father and grandfather were veterans of the Civil War. A brother, the late Lieutenant Colonel Fred. E. Jones, M.C., was a veteran of World War I, and another brother, Colonel W. C. Jones, U.S.A. retired, was a veteran of the Spanish American war and World War I."

The Boston Globe reported, on October 24, that John L. Kerr, VI, was missing in the fire at Fortune's Rock, Maine. John had left his home in Marblehead the day before to go to his summer place, accompanied by his wife and his mother, who were reported safe. We sincerely hope that nothing serious happened to John. — On December 16, Bill Brewster, II, President and Treasurer of the Plymouth Cordage Company since 1938, was elected as a director of the

New England Telephone and Telegraph Company, at a meeting in Boston of the directors. — Last June, Bob Weeks, VI, took me to see in Providence a broadcasting tower built and erected by his Wind Turbine Company. Bob called it a vertical radiator. It was vertical all right, and looked from a distance about as substantial as something made of a "Mechano" set. When we got right up to it, I, having assisted Miles Langley in thesis design of a transmission tower, could somehow appreciate that Bob had done a swell job. This company has built a large number of towers for mobile communications, frequency modulation, radio, and television home receivers. Bob is still our outstanding "pep" boy. — Albert C. Brown, I, is acting chief of the district real estate branch in the Cincinnati office of the Ohio River division of the Army Corps of Engineers. Al is one of our reticent classmates, and we have his wife to thank for this information in a clipping from a Cincinnati paper. — FREDERICK D. MURDOCK, Secretary, Murdock Webbing Company, Box 788, Pawtucket, R.I.

1914

A group of Greater New York classmates spent a very pleasant evening on December 9, the principal event being a dinner at the Hotel Biltmore given by the M.I.T. Club of New York in honor of President and Mrs. Compton. This event was greatly enhanced by the hospitality of Charlie and Marie Fiske, who opened their near-by apartment both before and after dinner. As evidence of the appreciation of the Fiskes' predinner party, practically every 1914 man attending the dinner returned to the Fiskes' after the dinner to visit some more. Those present, in addition to Charlie and Marie Fiske, were Homer and Mrs. Calver, Ray and Mrs. MacCart, Art Peaslee, Ralph and Mrs. Perry, Alden Waitt, Ben and Mrs. Rauber, Bull Owen, Chet Ober, your Secretary and Mrs. Richmond.

This return visit to the Fiskes leads your Secretary to comment on Technology dinners in general. What is their purpose? Is it not to provide an occasion when Technology men may get together, chat with one another, and learn something about the Institute? Then why have them so long? The recent dinner was splendid except that it continued after it was finished. If, after Dr. Compton's fine address, the dinner could have adjourned to entertainment already provided in another part of the hotel, it would have been so much more pleasant and would have provided an opportunity for visiting with classmates and other friends. The supplemental entertainment was fine, but it prevented this getting together and proved embarrassing to many who left the tables while it was still in progress because they wanted to see other friends or catch trains. We of '14 who had already made our plans to be together greatly regretted missing the after-dinner reception to Dr. and Mrs. Compton. The Class is contemplating starting a movement to end all Technology dinners, wherever held, at ten o'clock, then let the informal party run as long as desired. Any other classes want to join the movement?

Notices sent out by Charlie brought back the information that Bill Simpson has left

Long Island and is now located at Lakeside, Calif., about 18 miles from San Diego. Bill has bought an avocado ranch in a district known as Wintergardens and expects to combine some productive activity with pleasant Southern California retirement. Bill would welcome a visit from any '14 man who may be passing near San Diego.

Another reply came from Lin Faunce, who regretted that an all-day-and-evening conference on new telephone plant construction would require him to be in Newark on the evening of the dinner. Faunce, it will be recalled, is with the New Jersey Bell Telephone Company. Lin wrote that his son Jack is now in Cleveland with the Aetna Life Insurance Company and that his daughter Nancy is now at West Hartford, Conn., with her 10-months-old son. The latter statement made by Lin just proves that he, too, is eligible for membership in the very rapidly growing club of '14 grandfathers.

Another classmate to become a retired gentleman farmer is Henry Merrill, who has settled down at Milford in southern New Hampshire after trying out some other locations. It will be recalled that Henry spent most of his time after graduation in China with the Standard Oil Company, and he is now enjoying the retirement benefits accruing from his foreign service.

Ray Dinsmore pops up in the news again, having been selected as one of the 10 best rubber chemists in the country. The selection was by a poll conducted by the Chicago section of the American Chemical Society. Dinsmore is in charge of research at the Goodyear Tire and Rubber Company.

Word has been received of the death (date not given) of Jesse Emanuel Martsof. Martsof was a special student in Architecture and was with us during the second and third years. He had practiced architecture at New Brighton, Pa., ever since leaving the Institute. The class records show that he was married and had two daughters. — H. B. RICHMOND, Secretary, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, Assistant Secretary, 1775 Broadway, New York 19, N.Y.

1915

You will remember that our now famous class slogan, "Help Azel," originated when Herb Swift found it necessary to censor some of the scenes in his "artistic" movie and replace the deleted footage with his "Help Azel" appeal to pay your class dues. With that in mind, in February, you'll again hear my plea — it isn't often, it isn't much — and you chaps always come through nobly, promptly, and generously. Just feel as though you really want to give that \$2.00 or \$5.00, or more, to our Class, and I'll not say any more about it.

Occasionally, there are requests for old copies of "Technique." The Technique management has the following copies on hand and has agreed to sell them at a uniform price of \$4.00 a copy: one copy—1892, 1898, 1908, 1909, 1910, 1918, 1925, 1944; two to five copies—1897, 1899, 1900, 1902, 1903, 1904, 1905, 1906, 1920, 1923, 1926; six or more—1907, 1913, 1924, and all classes thereafter except 1943 and 1944. In 1924, the method of dating was changed.

Therefore, to be sure he gets the right volume, an Alumnus requesting a copy before that date should specify which senior portfolio he wants. The 1920 Technique, for example, contains the senior portfolio for the Class of 1919. Incidentally, some classes, looking ahead to possible future publications of reunion books, may want a couple of copies of their Techniques, with the idea of cutting them up for "Now and Then" comparisons. This is an opportune time — in some cases the only time — to get them. If interested, write direct to Technique, Walker Memorial, M.I.T., Cambridge 39, Mass.

Ray Stringfield sent this item: "Chemical and Engineering News for December 1 on page 3572 announces that in a poll conducted by the Chemical Bulletin, publication of the Chicago section of the American Chemical Society, to get their members' vote for the 10 ablest chemists and chemical engineers in each of 20 specialized fields, our classmate Allen Abrams was selected as one of the 10 in the field of industrial and engineering chemistry, along with such good company as E. K. Bolton of Du Pont, George Curme, Jr., of Bakelite, and Willard Dow of Dow Chemical. Allen, kindly remove your hat!" Congratulations to Allen for such a signal honor and distinction.

Frank Scully is back from his European trip; so perhaps we can soon get him to give us some of his experiences and impressions. — As we send in these notes we find an item in this morning's paper: "The first of the winter series of Society of Arts popular science lectures will be given on Sunday, December 21, at Technology, at 4:00 P.M., with Professor William L. Campbell as speaker. His subject will be: 'New Developments in Food Technology, One Answer to Food Shortages.'" This is certainly of interest to us all, especially during these times.

How these 1915 men do get around! They're never too old . . . and so forth. The Franklin, N.H., *Journal-Transcript* of October 23 says, "Herbert D. Swift was in Boston last week to attend a reunion of his Class, M.I.T. 1915, held at the Harvard Club."

A final word about class dues — and an important one — with your check write something about yourself, your family, your business, your plans for retirement, or anything else that your classmates will be glad and interested to read in our column of notes. "O, Come all ye Faithful!" — AZEL W. MACK, Secretary, 40 St. Paul Street, Brookline 46, Mass.

1916

We have received an interesting letter from Berthoud C. Boulton of Des Moines, Iowa; and, by the way, Berthoud would like to know of any classmates in his vicinity. Our West Central Region gives these Iowa addresses: Professor Herbert J. Gilkey, Iowa State College, Ames, Iowa, and George A. Spooner, 5707 Woodland Road, Des Moines, Iowa. Berthoud writes as follows: "After 28 years of active work in the aircraft field in technical and administrative activities, I have decided to enter an apparently widely divorced field of engineering. After nearly two years as administrative engineer with Harry Ferguson, Inc., of Detroit, where I learned a good deal about

farm implements, I accepted a position as chief engineer of product design with the John Deere works at Des Moines. This plant is one of 16 owned by Deere and Company — probably one of the oldest and largest manufacturers of agricultural machinery. The company's centennial was celebrated in 1937. On October 1, we took over the large ordnance plant here operated by United States Rubber for the production of .30 and .50 caliber ammunition and are building up our organization from scratch. Early next spring we go into the production of tractor operated cornpickers, cultivators, and haying equipment. With 1,800,000 square feet of excellent factory floor space, we should have a most interesting operation in two years or so. The one thing that has impressed me most strongly since entering my present field is the wide applicability of the principles of technical design and production and administrative methods, learned through the years in aircraft work, to the design and manufacture of agricultural machinery."

Berthoud tells us that he has four daughters, two of whom, Ruth and Heather, are happily married. A third daughter, Barbara, is planning the same course of action next June. Katherine, the oldest, will probably attend Iowa State College next year to study ceramic engineering and design. As she already has a B.S. from Washington University in St. Louis, she will probably hop off like the others and, having completed her technical work, apply her knowledge to the baking of artistic ceramic pies and biscuits for an appreciative husband! An 11-year-old son, John, is reported to be a husky lad with lots of intelligence and life but no pronounced engineering tendencies.

We have received an interesting letter from Theron S. Curtis, who informs us that he is in his 17th year with the Industrial Trust Company, acting now in the capacity of vice-president in charge of the Bank's main office properties. He continues thus: "I have the pleasure of frequent contacts with our classmate, Hovey Freeman, who, incidentally, is a director of the bank. My main hobby and recreation are centered around Falmouth, Mass., where, weather permitting, we spend the week ends the year around, enjoying the activities that go with a seaside resort. Our two sons are now 31 and 28. The older was graduated from Technology in the Class of '39. We have hopes that there may be another member of the Curtis Clan to graduate about 1970. Thus far, the score is one granddaughter."

We have another banker, Ted Jewett, who was elected trustee of the Erie County Savings Bank. Ted is a vice-president and director of Spencer Kellogg and Sons, Inc. He was plant engineer of J. H. Williams and Company and vice-president of the Larkin Company, Inc., before joining Spencer Kellogg and Sons. Ted is a director of the Buffalo chamber of commerce.

Earl R. Mellen, President of the Weston Electrical Instrument Corporation, has sent your Secretary an excellent booklet covering the highlights and important dates in the history of the corporation since its inception in 1888. Also, in commemoration of the 60th anniversary of the founding and the opening of the new research and engineering laboratories, a thermometer has been received. This valuable and interesting gad-

get apparently determines the temperature of almost anything. Earl has not told us much about his outside activities, but we hope to hear further from him.

And we have a welcome, crisp little note from Maynard C. Guss which reads: "I have been with the engineering department of Standard Oil from July, 1916, to date; in China until Pearl Harbor Day and in the New York office since. I am retiring in 1948 and am open for suggestions as to an ideal spot to which to retreat. We have two children, one married and one in college, and live in Great Neck, Long Island, but I do not care to remain there."—RALPH A. FLETCHER, Secretary, P.O. Box 71, West Chelmsford, Mass. HAROLD F. DODGE, Assistant Secretary, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

1917

Material for the column this month is meager — but does have an interesting geographical spread. Most impressive, perhaps, is the collection about the "First American family in London." We recall that the education of Ambassador Douglas was divided into two approximately equal parts — four years at Amherst, and one year with the Class of 1917 at Technology. Articles about him, and about his family and work, have been circulated so generally through magazines of national distribution that repetition here is undesirable. The pressure of clippings and news items about him is so great, however, that your secretaries will be forgiven if references to him appear rather frequently.

At the other extreme, geographically, is another diplomat and ambassador. The *American Hampshire Herdsman* for November publishes the following: "Tourtellotte Again Host-Deluxe. Third Janalu Judging Contest Attracts 46 teams from F.F.A. Chapters in Washington. — Forty-six teams representing high schools over the entire State of Washington competed in the third annual F.F.A. Janalu Farm Hampshire Swine Judging Contest, Saturday, September 27. . . . With the alternates and spectators there was an attendance in excess of 600 people. Janalu Farm is located in Happy Valley on the Avondale Road between Redmond and Cottabe Lake, Washington, on Puget Sound in the northwestern part of the State of Washington. Teams came from as far away as Walla Walla, Washington, in the extreme southeastern corner. Banner prizes were awarded for the first ten teams and also for the first ten individual boys. This wide divergence in location of both winning teams and winning boys was of great satisfaction to Neal Tourtellotte of Janalu Farm in that it reflects the wide interest of F.F.A. boys of the entire state in the raising and judging of swine."

A third of the way from M.I.T. to Neal's interesting quarters, we find Robert R. Harkness, associated with the magazine *Made-moiselle* at 230 North Michigan Boulevard, Chicago. And in Florida, Lucas E. Schoonmaker, who, as an Army colonel, commanded Dutch and American forces in Curaçao, Netherlands West Indies, during the war, has been appointed assistant professor of electrical engineering at the University of Florida. Schoonie was one of the

few Americans to be given the Order of Orange Nassau by Queen Wilhelmina, in recognition of his services. He will now live in Gainesville, Fla.

It is again our sad duty to note the passing of a classmate, Joseph P. Connolly, at his home in Rapid City, S.D., on October 7.

Since these brief notes are not being prepared by Ted Bernard, this is a proper occasion to remark that recently the Harvard Business School published a list of graduates in the class of last November. It was a large class, and the list was headed by a small group of those who had been graduated "with distinction." The small group included David Bernard, son of our present Assistant Secretary. After graduation, David joined the Dewey and Almy Chemical Company, which is headed by the late Professor Davis R. Dewey's famous son, Bradley Dewey '09. — RAYMOND STEVENS, Secretary, 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, Assistant Secretary, 24 Federal Street, Boston, Mass.

1918

A New Year's greeting from John Kilduff contained a generous donation to the organ fund — doubly generous in the light of the fact that his daughter, Jeanne, was the victim of an explosion in one of the M.I.T. research laboratories and had to be hospitalized for months with serious burns on her face and arms. Both she and John have gone through the whole experience with unflinching spirit. In the sterner school beyond the classroom walls, John certainly won his laurels as a man able to face up to the hazards of life.

You have seen by the papers, of course, that Frank Creedon gave up his position as Federal Housing Expediter to work for the General Electric Corporation as construction project manager at the Hanford Works, Richland, Wash. This mysterious and remote set of buildings are for the United States Atomic Energy Commission. In recent months a number of hitherto secret atomic matters have been "declassified," and the commission has announced a policy of attempting to spread atomic knowledge of a nonsecret nature among American scientists and industry as rapidly as possible. The Atomic Energy Act of 1946 gives the government exclusive control over any atomic energy work with a military application and all production of fissionable materials. Frank is a comparatively old hand in the new field of atomic energy. He managed the construction of the atomic project at Oak Ridge, Tenn., during the war.

Leonard Levine, who for four years was a member of the Navy's staff of designing marine engineers at the Fore River yard and 20 other yards, is now assistant manager of the United Shipbuilding Corporation in East Boston, where he is at work on the building of a 100-foot fishing trawler in new construction and many miscellaneous repairs. While employed in the Navy's small craft section in World War II, Leonard says he aided in building 3,000 vessels. The thought gives us a headache. Just imagine playing with three thousand metacentric heights, and getting the right one on each lovely little landing craft. Perhaps we had better turn to some lighter consideration: making out our income tax, for example. —

GRETCHEN PALMER, Secretary, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

Those of the Class who heard President Compton speak at the 1947 Compton Dinner at the Biltmore Hotel on December 9 — namely, Braverman, Riegel, Smoley, and Wiren — were amply repaid for their attendance. It was pleasant to get around and see many of the M.I.T. men from other classes. Your Secretary heard from L. A. Gillett, chief engineer of the Virginian Railway Company in Norfolk, Va., expressing his regrets at not being able to attend this dinner. Don Way and Will Langille also expressed their regrets as they had an important company dinner the same evening.

The Riegel Paper Company, with which he had been employed, wrote your Secretary that George French had died at Camarillo, Calif., late in October. The *New York Times* for October 25 reported that Colonel George F. French, electrochemical engineer and veteran of both World Wars, had died on October 22, in Hollywood, Calif., after a brief illness. The Class will be shocked to hear this news, as he was very popular and well known among us. He had been residing at Garden City, Long Island, and was 50 years old. He was born in Newport, R.I. Surviving are a son, George Franklin French, 3d, of California, and a brother, Cedric C. French of Garden City.

The *Berkshire Eagle* of Pittsfield, Mass., stated on November 6 that A. W. Hough had been appointed as manager of manufacturing for the General Electric Company. Hough was an ensign in World War I and joined the General Electric Company in 1922 and has worked in Pittsfield ever since. He first worked on wage rates and was one of the organizers of this function at the Pittsfield works. In 1931, he assumed production control duties and in 1932 became wage rate supervisor and also supervisor of the suggestion system. He was appointed superintendent of the distribution transformer division in September, 1933. Mr. Hough lives at 28 Revere Parkway, Pittsfield, and has three children: Mrs. Thornton Wierum of New York; a son, Gordon, who is a student at Northwestern University; and a daughter, Grace, a student at Skidmore College.

A newspaper clipping from the *Traveler Bureau* dated November 17 carried the story of a \$6,000,000 suit against the Army by two Massachusetts chemists. The claim is a process for preventing wool shrinkage. Leighton B. Smith, research chemist for Lever Brothers, is one of the plaintiffs, who claim that they developed the process in 1924.

A. Annan Cook, a lieutenant colonel, is serving in Manila, where his wife has joined him. During the war, his three sons were in the Army, the Army Air Forces, and the Navy; his daughter attended nursing school. All but one son are now married, and Cook has two grandchildren.

Elisabeth Coit is now associated with the firm of Mayer and Whittlesey, architects, 31 Union Square, New York 3, N.Y.

Buzz de Lima, on December 8, wrote as follows: "All right, Gen! Here's a little note for you: I was momentarily in the lobby of the Hotel Nacional in Habana,

when I heard someone calling 'Oscar!' Now, no one ever calls me 'Oscar,' but curiosity made me turn around. I found myself looking into the quizzical eyes of Lobby Lobdell, '17, whom I hadn't seen since he fired me from the staff of the old *Tech!* Lobby was in Cuba doing his usual good work for the Alumni. We exchanged a few words — pleasant words — and then he was whisked off to dinner at the Country Club, and I drifted farther southward on my little mission for the Caribbean Commission. I returned today to find your card awaiting me." — Roy Burbank writes, "Sorry I haven't any news to send along. I'm still in the same place and doing about the same sort of things."

The 1946-1947 Alumni Fund shows for the Class of 1919 a contribution of \$1,692 representing 56 per cent of the quota and 141 contributors representing 92 per cent of the quota. The tabulation for contributions since 1940 shows \$9,459 which is considerably lower than those of classes graduating within five years before and after our Class. — EUGENE R. SMOLEY, Secretary, The Lummus Company, 420 Lexington Avenue, New York 17, N.Y. ALAN G. RICHARDS, Assistant Secretary, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

1920

While in New York early in December attending the Chemical Show, the Secretary had the pleasure of visiting Tony Anable, who was presiding at the Dorr Company exhibit, and with Al Burke, who was at the Sharples exhibit. Hank Caldwell, who is usually at the Swenson Evaporator exhibit, was not to be seen. Tony looks none the worse for his Navy experiences, and, on thinking back to school days, I should say he has changed less than most of us have.

I ran into Buzz Burroughs in the New York subway, and there is another guy who hasn't changed much. He is still with the Dexter Folder Company in New York, and he is looking forward to any or all reunions that the Class may have in the future. He is active in M.I.T. affairs in New York.

Mention was made in previous notes that David P. Brown had been made chief surveyor of the American Bureau of Shipping. We have word from the Department of Naval Architecture that this is a very important post and one involving great responsibility. It is an honor to have a classmate in this position. — Roger B. Colton, who was a major general in the Signal Corps, has been made vice-president of the Federal Telephone and Radio Corporation. General Colton received an M.S. degree in 1920.

J. Gardner Coolidge has left Brookline and is living in Rye, N.Y. Fred Earle has left Brooklyn and is in Long Beach, Calif. Rear Admiral Arthur C. Miles is back in Washington. Clyde A. Norton has left Buffalo and is in New York City with Norton and Simmons at 52 Vanderbilt Avenue. Colonel Edmund Sullivan is with the United States Public Health Service in New Orleans. John Chester Wilson, familiarly known as Woody, is still in Seattle, Wash., and his address is 12756 42d Avenue, Northeast. We sure would like to hear from you, Woody.

Here's wishing each and every one of you a happy and prosperous year in 1948. — HAROLD BUGBEE, Secretary, 7 Dartmouth Street, Winchester, Mass.

1921

Irv Jakobson, President and general manager of the Jakobson Shipyard, Inc., Oyster Bay, N.Y., is the first to report for the Secretarial Committee this month. Says Jake: "My wife, my son, and I recently took a motor trip through New England and visited Sandy McMorran and his family at their home in Boxford, Mass. They live in a real, old farmhouse in a delightful section of the countryside and are very happy and contented up there. Sandy is president of the Iona Supply Company, with offices in Salem. His company distributes household merchandise, and he reports great activity in the business. Sandy and his wife have a son, Peter, 17 years old and currently attending the Berkeley School in Boston; he plans to enter Boston University this fall. On the way back, we stopped in Hartford and visited with George Johnson '23 and his family. George is the head of a building construction organization — the Richard Johnson Company — and is very active in industrial construction in Hartford.

"At the recent annual banquet of the Society of Naval Architects and Marine Engineers, I chatted with Philip W. Clark, who is a naval architect with the Army Transport Service. I learned that Arthur R. Gatewood is the chief engineering surveyor for the American Bureau of Shipping."

An article in the New York *Herald Tribune* describes the concluding session of the annual convention of the Society of Naval Architects and Marine Engineers, which was held at the United States Merchant Marine Academy, Kings Point, Long Island, N.Y., in order to observe the dedication ceremonies of the Howard L. Vickery Memorial Gate. The late Vice Admiral, the first of the Class to reach that rank, was vice-chairman of the United States Maritime Commission in charge of production for all ship-building activities during the war.

Our Class President, Ray St. Laurent, writes: "About a month ago Albert J. Hanley was at the Rogers Corporation plant in Goodyear, Conn., where Saul Silverstein, Joe Lurie, and I had a very enjoyable time talking over old times as well as business topics of mutual interest. Al is with Respro, Inc., of Cranston, R.I. He has increased his latitudinal proportions in the same way that some of the rest of us have, which I credit largely to age. I suppose it is fortunate we don't increase our longitudinal proportions similarly."

Arnold C. Rood, member of the firm of Kent and Rood, Boston patent lawyers, has been named lecturer in patent law at the Boston University school of law. Ace also serves as a member of the council of the Institute's Alumni Association.

Bill Loesch of the Forbes Finishes Division of the Pittsburgh Glass Company of Cleveland, was a welcome visitor to New York. Officially attending the sessions of the National Association of Manufacturers at the Waldorf-Astoria, Bill brought his family along and picked up his son, who is at the Naval Academy, so the group could get together at the Army-Navy game. Dan

Harvey says that he and Bill managed to sandwich a meeting in between the N.A.M. sessions.

Our Denver reporter, Dana E. Kepner, hydraulic and sanitary engineer, writes from 1921 Blake Street: "There is little to add to my voluminous report of last March. I'm still putting in a lot of time and effort with the Colorado Society of Engineers, the Colorado Engineering Council, and the Denver Council of Camera Clubs. I have recently put on a photographic salon for the latter. Business has been very good — too good, in fact. I seem to spend more time trying to get shipment of goods from the manufacturers I represent than I do getting orders. It is a trying situation. But when I'm about to blow my top, I just leave the office and go downstairs to my photographic dark room, where I can become engrossed in producing a new picture and forget my worries. Or I can get in the car and drive to the mountains or over the plains, which is similarly a wonderful tonic.

"Last August, my father passed away after suffering many months. My brother Harold ('20) and I are co-executors of the estate and, since Harold lives in Logan, Utah, and is not very well, the details have fallen on my shoulders. It's an education in law and government red tape, and I'm thankful I took a course in business law at Northwestern some years back. I have just read President Compton's annual report. It surely is a masterpiece. What a man! What an Institution!"

Sumner Hayward of the New York Telephone Company, is a near neighbor of the Malcolm B. Leesons in Ridgewood, N.J., with whom he attended the Army-Navy game. Mal and Connie (Nelson) Lees have two sons, Bruce, who is a sophomore at Cornell, and Ned, a junior in high school. We ran into Sumner at a telephone company demonstration of the Boston microwave link, and he reported having seen Moose LeFevre hurrying about downtown New York in the Xmas shopping crowds. Sumner, George Chutter, Asher Cohen, Fred Kowarsky, Harold Stose, and Joe Wenick attended the dinner meeting held by the M.I.T. Club of Northern New Jersey, at which General George C. Kenney '11, was the principal speaker and Orville B. Denison '11, of Gardner, Mass., handled the songs and cheers as only Dennie can.

One of our most faithful correspondents, Walter E. Church of the Portland, Ore., architectural firm of Whitehouse, Church, Newberry and Roehr, says: "Forgive the brevity. After all, when there are only four of us now around here and all are reasonably law-abiding, or at least careful, it is difficult to produce news items. Perhaps you can pad these notes in the right places and lengthen them to give that 'new look.' Glenn Stanton has recently been nominated by the northwest chapters of the American Institute of Architects for national vice-president. Fred Smith, son of Irving G. Smith, is doing a hitch in the Marines and has recently been promoted to corporal. Colonel Leland H. Hewitt, district engineer of the Seattle District for the United States Engineers, gave an interesting talk before the Portland chapter of the Society of American Military Engineers. Bill Church, the second of my three sons, is

now an electronics technician's mate in the Navy. His tour of duty will be completed in July, and he hopes to enter M.I.T. next fall. I understand that Kenneth Moores of the K. A. Moores Company of Seattle was in Portland not long ago, but unfortunately I missed seeing him."

Sincere sympathy is extended to Edward C. Layng of Short Hills, N.J., on the recent death of his father.

Helier Rodriguez, President of the M.I.T. Club of Cuba, has written a complete account of the three-day celebration marking the visit of the Alumni Executive Vice-president, Harold E. Lobdell '17, to Havana in November. A long article in *Diario de la Marina* is accompanied by a photograph of Helier and representatives of the Cuban Alumni greeting "el caballero de agradable personalidad." Writes Helier: "We had a good attendance of about 30 members of the Havana Technology Club, who with their wives and guests made a total of about 55. The site of the reunion was the terrace of the Country Club, which is a delightful spot. On Lobby's arrival, Graciela and I invited him to dinner with another couple and then took him to the *jai alai* game. The next day he was taken to Morro Castle, old Havana, and then several of the best clubs; in the evening we had our formal meeting at the Country Club. The next day we took him to a sugar mill, where we had luncheon with two Technology graduates, and then to the school of engineering at the University of Havana, where all the engineering professors had been summoned for an informal reception. In the evening there was a round of the night clubs. Lobby's visit offered a very good opportunity for getting all the local Alumni together, and we had an enjoyable gathering. I had a motion picture made as a permanent record of the occasion. You see, I am doing my share here to promote Tech spirit. By the way, at the meeting, at which I had the honor of presiding, ours was the earliest class represented except that of our guest of honor."

A note from Chick Kane '24, Director of the Alumni Fund, informs us that the present Technique Board has set a uniform price of \$4.00 for all back numbers in stock. However, "Technique—1922," which contained our senior portfolio, is not listed in the available issues, nor is "Technique—1921." If those of you who wish copies of these issues and those who have copies which they are willing to sell will drop a line to your Secretary, we will endeavor to refer you to one another to complete the deals.

From the December issue of *Electrical Engineering*: "The Engineering Foundation re-elected Dr. A. B. Kinzel, Vice President of the Union Carbide and Carbon Research Laboratories, Inc., as its chairman at the annual meeting of its board of directors." Gus continues his term on the executive committee, of which he is chairman.

Two notes are the month's contribution from Herb DeStaeble, Vice-president of the Lambert Pharmacal Company of St. Louis. The first reads, "Jack Rule, besides being a big wheel at the Institute, has been a grandfather for some two months. He did it the hard way — his second son, Tony. It must be pretty nice to be a grandfather but what a shock to be married to a grand-

mother!" A note to Jack for details has so far produced no graphic results. In answer to a query about the participation of Herb, Jr., as a member of the sophomore Field Day football team, Herb replied: "The sophs did win by a score of 6-0. Hobey played right halfback on offense and fullback on defense and called signals. We recently had a local Tech meeting for Professor Bat Thresher '20. Gene Weil was there, looking very well."

The Navy Department has announced the promotion of Edmund E. Brady from captain to commodore. Franklin O. Carroll, a brigadier general, has been assigned charge of the Air Materiel Command at Wright Field. John R. Hardin, a colonel in the Corps of Engineers, now heads the New Orleans Engineer District. In the ex-brass department is Richmond H. Skinner, a former lieutenant colonel in the Chemical Warfare Service. Dick served in the Pacific and received the Legion of Merit from the Navy for his work on Leyte and Luzon. He makes his home at 177 Reservoir Road, Chestnut Hill 67, Mass., and operates a charter flying service and aerial photographic survey activities at the Alton Bay, N.H., seaplane base.

Eliot Underhill of San Francisco writes that he is traveling the entire western portion of the country for a firm of consulting engineers. His work is chiefly concerned with production, plant layout, and industrial engineering problems, with occasional forays into sales, organization, and control work. His activities involve, for the most part, the lumber, steel fabrication, and cement industries.

Better a February completion of that January resolution than none at all: write to your Secretary now. — CAROLE A. CLARKE, Secretary, International Standard Electric Corporation, 67 Broad Street, New York 4, N.Y.

1922

Your Secretary is glad to report a correction with respect to the outcome of the golf tournament at the 25th reunion. Hugh Shirey, our astute financier from Rochester, was the low gross winner with 82, while Larry Davis, erroneously reported as the winner in the November Review notes, was the runner-up, with an 84.

The newly issued Directory of the Alumni Association for 1947-1948 has just come to hand. It is pleasant to be able to report that many members of the Class are active in Alumni affairs. For those of you who do not happen to have a copy of the directory, the following is a list of those whose names appear therein: Vice-president of the Alumni Association, George Dandrow; term members of the Corporation, Don Carpenter, H. W. McCurdy, Fred Blackall, Al Browning, and George Dandrow; members of standing committees of the Alumni Association: increased activities of Alumni Council, George Dandrow; committee to nominate representatives of local associations, Parke Appel and Bob Tonon; 25-year class committee, Bill Mueser; class representative on the Alumni Council, Bob Tonon; local representatives of M.I.T. clubs: M.I.T. Club of Chile, Warren Ferguson; M.I.T. Club of Cuba, Buck Eacker; M.I.T. Club of New York, John Teeter; M.I.T. Club of

Western Pennsylvania, Tom Shepherd; M.I.T. Club of Utah, Parke Appel; M.I.T. Club of Schenectady, Karl Wildes. Alumni representatives on the Departmental Visiting Committees: Military Science and Tactics, William F. Heavey; Modern Languages, Ted Miller. Class Agent, Warren Ferguson. Officers of local alumni associations and clubs: Buenos Aires, Roberto J. Ottonello, Secretary-Treasurer; New York, Ray Rundlett, President; Oslo, Norway, Claus Theilfesen, Secretary; Richmond, Va., John Williams, President; Springfield, Mass., Minot Edwards, Secretary. Honorary Secretaries: Washington, D.C., Harry H. Fisk, Bill MacMahon, Bod Thulman; Atlanta, Bill Huger; Wichita, Kansas, Fred Koch; Augusta, Maine, Bob Purinton; Irvington, N.J., Bill Grady; Morristown, N.J., Ev Vilet; Trenton, N. J., Tom Gill; Buffalo, Whit Ferguson; New York City, George Dandrow, Larry Davis, Dunc Linsley, Bill Mueser, Ray Rundlett; Rochester, Dwight Vandevate; Syracuse, Ed Gruppe; Philadelphia, Phil Alden and Charlie Stose; Seattle, Horace McCurdy; Toronto, Bill Elmer; Bogota, Colombia, John Bower; Zurich, Switzerland, Werner Schoop.

Charlie Locke '96 reports that he has word that Norman L. Smith recently completed a survey of 60 square miles of asbestos ground in Quebec. The Register of Former Students notifies us that George M. Robertson, II, died on May 31. Your Secretary regrets that he has no further information at the moment.

New Addresses: Harold H. Spengler, General Electric Company, Glass Technology Laboratory, 1133 East 152d Street, Cleveland, Ohio; George W. Heathman, 105 Fir Hill Street, Akron, Ohio; Rudolph H. Blatter, Institute of Inter-American Affairs, Quito, Ecuador. — C. YARDLEY CHITTICK, Secretary, 77 Franklin Street, Boston 10, Mass. WHITWORTH FERGUSON, Assistant Secretary, 333 Ellicott Street, Buffalo 3, N.Y.

1923

A good part of the returns from the reunion mailing of November 15 are now in. In this, members of the Class were asked to say what their chances are of getting to Alumni Day in Cambridge on June 12, and to the class reunion at New London, from June 13 to June 16. The tally (on December 17) showed that 75 men were sure they were coming and that they probably would be accompanied by a total of 31 wives and 10 children. Forty-eight others said the chances of their getting to the reunion were good and that they expected to bring with them a total of 21 wives and 9 children. From this you can see that a very large attendance is indicated. At a minimum, the party seems certain to number at least 116; and if you count in those who have reported a good chance of coming, the total is 194. Not included in the above figures are 59 additional returns from men who said that, although their attendance was doubtful at the moment, they wanted to be kept informed. I think it is certain that some of them are going to come, too. By the time these notes appear, another mailing about the reunion will probably be on the way to you. With it I hope to include a revised 25-year list with 100 or more additional

names of men who have sent in personal data about themselves subsequent to last May.

A good deal of interest in the reunion is evident. John Burchard and Julian Berla, as a result of a powwow following a recent meeting of the Washington Society of M.I.T., are cooking up a scheme to round up the members of Course IV. P. B. Alger is undertaking to get in touch with some of the Course VI and VI-A men in metropolitan New York. A number of the members of the Class, notably Al Redway of New Haven and Howard F. Russell, Assistant Class Secretary, have talked with men on the West Coast while on recent trips there.

I have had a number of interesting personal notes, which have come in with the reunion returns. One is from Alfred M. Perkins, who runs an enterprise known as Casa de Las Cruces, which provides an overnight stop for tourists at Las Cruces, N.M. A piece of printed material describing the establishment says: "We hope you'll not hurry away, for there is much to be seen in this vicinity — quaint old communities, ruins of prehistoric habitations, mines, mineral deposits, desert, rich farm country, and awe-inspiring geological formations, including craters and startling sinkholes. We recommend Don Alfredo as a guide." I get the impression that Don Alfredo is greatly enjoying his enterprise. — I also had a nice note from J. W. Voelcker, who lives in Esher in Surrey, England, bringing pleasant remembrance of a visit I had with him in 1943. — Colonel John W. Coffey, who is professor of ordnance at the United States Military Academy at West Point, sent a friendly note sympathizing with your Class Secretary, saying that he had had a similar job to do in connection with a reunion of the West Point class of August, 1917.

I regret to report that the reunion mailing brought a response from Mrs. Musser, telling of the death of Neil Borquist Musser of Pasadena on September 27. — Henry Armington is president this year of the M.I.T. Club of Wellesley. — The National Council of Textile School Deans at their autumn conference in Sanford, Maine, in October, elected as a member Edward R. Schwarz, Professor of Textile Technology, M.I.T. — HORATIO L. BOND, Secretary, National Fire Protection Association, 60 Batterymarch, Boston 10, Mass. HOWARD F. RUSSELL, Assistant Secretary, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

1924

As Frank Shaw reminded you in his very good letter of December 12, news does not grow on trees, and the Secretary would like to hear from you. The first, and so far, only reply containing news is that from A. L. Malherbe, who writes from South Africa to inquire whether there are any other '24 men in the region. He describes himself as an agricultural engineer, and his address is "Selukwe" Wepener, Orange Free State, South Africa.

From Professor Locke '96, comes word that George Holmes has resigned as an engineer with the United States Bureau of Mines and is now superintendent for the Jayhawk Construction Company of Billings, Mont., currently engaged in driving explora-

tory tunnels and diamond drilling at the Yellowtail dam site on the Big Horn River south of Hardin.

From the Boston papers, we learn that Frank Shaw has been made sales manager of the Rust Craft Publishers in Boston. Frank has been active for years in his home town of Wellesley, and has been chairman of the Community Fund drive and president of the Parent-Teachers Association. Also from Boston comes word of the promotion of Gordon Joyce to the post of division traffic superintendent of the New England Telephone and Telegraph Company for its central division, covering central Massachusetts and the entire State of New Hampshire.

Worcester papers recently told of the address given by our Dean of Engineering, Tom Sherwood, at the fall dinner meeting of the Worcester County Alumni Association of M.I.T.

Recent address changes from the Alumni Office indicate that Earle Bates has moved from Merion, Pa., to Chevy Chase, Md.; Jay Balsbaugh from Newton to Wellesley Hills; Francis Brown from Shepherdstown, W. Va., to Hagerstown, Md.; Howell Brown from Summit, N.J., to Mamaroneck, N.Y.; Jimmie Crist from Charleston to Atlanta; that Charlie Frank has gone from a lieutenant commandership to plain citizenship, as has Jack Hennessy from a lieutenant colonelcy; and that Harry Swicegood, a lieutenant colonel at Fort Adams, has returned to civilian life in Brockton. — FRANCIS A. BARRETT, General Secretary, 234 Washington Street, Providence, R.I. WILLIAM W. QUARLES, Assistant Secretary, 330 West 42d Street, New York 18, N.Y.

1926

The event of the month of December was the 1926 luncheon which Bill Latham arranged in New York. The primary objective of this luncheon was to discuss with Eben Haskell the status and plans for our 1926 class fund, but the luncheon also afforded a pleasant social occasion for the group who came together. Those who attended included the following: Allen B. Bassett, Saul Brodsky, Samuel W. Brooks, Wilbur W. Criswell, Jr., Emerson W. Eddy, William A. Forrester, Jr., Julius B. Goldberg, Malcolm S. Hird, Edward R. Huckman, Reverdy Johnson, Donald B. King, Clarence J. LeBel, Dudley L. Parsons, Richard H. Pough, and Horace C. Ruggles.

The luncheon was successful enough to induce Bill Latham to suggest that we ought to have another one in New York in the spring and Eben Haskell to suggest that we ought to try to do the same thing in Pittsburgh, Chicago, and perhaps other cities. The group meeting in New York made very specific and helpful suggestions to Eben in regard to carrying through on our announced goal of a class gift to M.I.T. at the time of our 25th reunion totaling \$100,000. The group indicated a genuine interest in the fund and a marked willingness to assist in reaching our announced goal.

I do not know to what extent the Class understands the tremendous amount of work and planning which Eben Haskell is putting into this class fund and program. The Secretary does know how much Eben is doing, and he would like to record his appreciation

of this fine example of altruistic effort in behalf of the Class and the Institute.

The Secretary attended a meeting of the M.I.T. Club of Cincinnati recently, and among those present was James L. Suydam, who is now with the Ferro Cement Construction Company. Jim was at one time in New York with Starrett Brothers and Eken, Inc. This was the first time that the Secretary had seen Jim since graduation. It was a pleasure to encounter him in Cincinnati and to find him thriving and prosperous.

Louis Bérubé reports that he has been appointed on a Canadian federal commission, the Fisheries Price Support Board. He continues at the École Supérieure des Pêcheries as secretary of studies and professor of fisheries economics. — Arthur Johnsen called the Secretary from New York in December to report that he was on the verge of taking off on a round-the-world trip which would take him to England, Turkey, India, the Philippines, Japan, and way stations. We have given him the names of any '26 men along the route, and he is going to report on them as he travels. Arthur is with the Reynolds Metal Company, with headquarters in Wilson Dam, Ala. — Nelson F. Wilmot read in the December issue of *The Review* that John B. Jacob is with the Research and Development Board. This prompted him to write the Secretary, who was delighted to have word from him. He is located in Chicago as district sales manager of the Mathieson Alkali Works. — JAMES R. KILLIAN, JR., General Secretary, Room 3-208, M.I.T., Cambridge 39, Mass.

1927

This month's mail bag contains a single item — a clipping from the Newark, N.J., *News* concerning Francis L. Burke, and it is quoted here below: "Industrial Japan, awakening to export trade possibilities, is attempting to recoup her war losses and recapture as quickly as possible her lost position in world trade. This observation of a Western Electric Company executive in the Japanese capital was reported here yesterday. The executive, Francis L. Burke of 4 Lexington Street, Newark, on a year's leave, is chief of the Kearny plant's industrial division manufacturing branch. In Tokyo since June 23, Burke has been assisting Gen. MacArthur with recommendations to step up production in communications manufacturing plants there. After a recent tour of Japanese factories, Burke wrote his company officials that he had been favorably impressed by the hard-working, friendly Japanese. 'Executive personnel,' he wrote, 'seems sincerely interested in increasing production and improving manufacturing equipment. The future possibilities of export trade serve as an additional incentive to these ends. Handicapped as the Japanese are with obsolete machinery, management wants American engineering and industrial know-how,' he added."

Copies of "Technique" for the years 1924, 1925, 1926, and 1927 are still available for those who want to secure back numbers of this publication. The price is \$4.00 a copy, and interested classmates should write directly to: Technique, Walker Memorial, M.I.T., Cambridge 39, Mass. —

JOSEPH S. HARRIS, General Secretary, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y.

1928

Our good Secretary, George Chatfield, has been so busy of late in his new job as vice-president of Kenyon and Eckhardt, Inc., that he has been unable to write some class notes for this particular issue. So that his good batting average for this year will not slump, I am taking the liberty of trying to pinch-hit for him. The first bit of news to report concerns George himself. I can best give you the story by quoting from a newspaper release, as follows: "Kenyon and Eckhardt, Inc., announces the election of George I. Chatfield . . . as Vice President. Before joining the agency in May, 1947, Mr. Chatfield was Assistant Advertising Manager of Lever Brothers with whom he was associated for 19 years. He worked on the initial five years of 'Spry' advertising and later directed and was responsible for all phases of Rinso and Lifebuoy advertising campaigns including the 'Amos 'n' Andy,' 'Big Sister,' and 'Bob Burns' radio programs. Born in Minneapolis, Minnesota, 42 years ago, he received his education in Minneapolis schools, Dunwoody Institute and the University of Minnesota. He received an S.B. degree in Engineering and Business Administration from . . . Technology in 1928, choosing for his senior thesis, 'A Study of Advertising Agencies.' On graduation and before entering advertising business, he ran his own printing business, held amateur and commercial radio operator's licenses, helped to install, operate and announced for WDCY's first transmitter." To George go the congratulations of us all for his fine promotion as well as our thanks for his work as secretary of the Class.

Roland Earle, general chairman for our 20th reunion, is busy with plans for this big event scheduled to be held at the Wianno Club in Wianno, Mass., on the week end of June 26. The details for the doings at the reunion are not fixed but will be announced through this column and through a general mailing to the Class just as soon as the committee has been able to complete the arrangements. Working with Roland will be Bill Kirk, Walter Smith, Jim Donovan, Mieth Maeser, Bill Bendz, and I. Please be sure to plan your schedules now so that business trips will bring you to New England over the week end of the 26th and our reunion will have a grand turnout. Wianno is a famous Technology reunion spot, which has excellent golf, good tennis, and swimming facilities.

Bill Gorfinkle is now residing at 503 Fairview Street, Austin, Minn., where he is employed by the Hormel Company in a very responsible position. Bob Woodbury, who served a long stretch in the Navy during the war, has returned to M.I.T. in the English Department. Jack Chamberlain, who was a commander in the Medical Corps and is known as one of Boston's leading surgeons, is assistant medical director at M.I.T. Isadore Silverman dropped into the office the other day after a long sojourn with the Bureau of Reclamation in Colorado. I was sorry that I did not have an opportunity to learn more about his doings as I was out of town at the time.

That is all the news I have been able to pick up this month. Next month George will be back in print as usual. Please help him by sending news about yourselves and other 1928 men. His new address is 49 Eton Road, Larchmont, N. Y. — RALPH T. JOPE, President, Room 7-203, M.I.T., Cambridge 39, Mass.

1934

Herb McKeague recently made another shift in employment and assumes a position of even greater responsibility. He has been appointed director of purchases of the Motor Wheel Corporation of Lansing, Mich. Herb started with the American Optical Company of Southbridge, Mass., in production control and time and motion study. He remained there until 1936, when he was appointed assistant to the general manager and treasurer of the Tobe Deutschmann Corporation of Canton, Mass. Some four years later, he joined the Westinghouse staff and for the next six years filled the position of purchasing agent in various divisions of the company. During this period, he was located in Baltimore and in Sharon and Sunbury, Pa. The last shift in the Westinghouse organization was to Pittsburgh as assistant to the vice-president in charge of purchases and traffic.

John S. Stevenson has been awarded a Canadian fellowship of the Guggenheim Memorial Foundation to carry out a study of ores and rocks in the British Columbia coast mountain ranges. — Benjamin S. Malin was married in October to Rosalyn Rosengard, daughter of Mr. and Mrs. Abraham Rosengard of Brookline.

Well, that is the news, folks. Pretty meager pickings for a class as large and active as ours. Perhaps if your Secretary had a mental teletroscope, he would be able to compound a column of reasonable volume and outstanding interest. But since he depends upon the written contributions of the members of the Class, he is very limited in the scope of his epistle. For it appears that most of the Class have scriptivitis — a chronic paralysis of the writing functions. We sincerely hope that a cure can be found for this ailment as we are certain that it is a drain on the entire class spirit. — JOHN G. CALLAN, JR., General Secretary, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, Assistant Secretary, Chile Exploration Company, Chuquicamata, Chile.

1935

Mike Kelakos has earned the Class of 1935 Secretary's Citation for 1947. He is the one classmate who has taken time to write a real newsletter about himself. In 1942, Mike entered antiaircraft artillery training; he went to England in 1943 and crossed the Channel on D-Day with the First Army. After V-E Day, Mike was transferred to the chemical section of the Production Control Division, Army of Occupation, with headquarters at Frankfurt. Shortly thereafter, he moved to Berlin to assist the Allied Control Council on problems relating to the German chemical industry. In May, 1946, Mike was discharged with the rank of lieutenant colonel but returned to Germany immediately as a technical advisor to the Allied Control

Council on reparations. Mike is in Berlin and wants to hear from his friends in the Class. His address is M. G. Kelakos, I.A.R.A., Berlin, in care of Berlin Command, A.P.O. 742, New York City.

Some months ago, Jack Seaver was promoted by the General Electric Company to the position of engineer in charge of the West Lynn Works laboratory. Jack has carried out noteworthy metallurgical research for G.E., by whom he has been employed since graduation. Jack lives with his wife and youngster, a son, in Marblehead. Another classmate with G. E. at Lynn is Herb Thomas. Herb attained the rank of lieutenant colonel in the Army during the war.

Al Mowatt, captain of crew in our senior year, is district manager for the Eastern Co-operatives, wholesalers, in the Philadelphia territory. He was formerly Eastern's representative in the vicinity of Hartford and Springfield. Between 1938 and 1945, Al worked for Westinghouse in the purchasing department. Al's experiences immediately after graduation were rather out-of-the-ordinary. In partnership with another young engineer, he extracted salt from sea water on Inagua in the Bahamas. Subversive agents incited an uprising of native workers, climaxed by Al, his partner, and his partner's wife having to escape from the island in an open boat.

Way back last spring, Bill Brockett married Eunice Thawley of Wilmington, Del. Bill is working for Du Pont in Wilmington, and at the time, Miss Thawley was, too. Johnnie Best, who works for Bendix in Baltimore, was an usher for Bill. Last fall Hugh Fenlon became engaged to Mimi Battey of Augusta, Ga. Hugh is a civil engineer in New York City. During the war he was commissioned in the Corps of Engineers and worked on aircraft design, for a time on the "flying wing." On October 28, Hank Ogorzaly had a daughter born, Cathryn Fleming. Last summer the Navy awarded Alden Tower a medal and plaque for outstanding service as chief hull draftsman at Bethlehem's record-breaking Hingham shipyard. Alden is married, has two youngsters, and lives in North Weymouth. Hal Bemis, formerly a lieutenant colonel, is back with the Campbell Soup Company in Toronto. Paul Cohen is with the Sperry Gyroscope Company in Brooklyn and lives with his wife and two youngsters at 31 Elwood Street, Glen Cove. Luke Packard, Class Treasurer, is working hard building up his own business, the Technology Instrument Corporation of Waltham. Luke is a member of the Boston section executive committee of the Institute of Radio Engineers. Another classmate in radio is Rolly Hanson, who is an electronic tube design engineer with General Electric. In October, Bob Granberg became a daddy for the third time — all three are young ladies, I believe.

I certainly could use some personal notes from you fellows. A month ago I was elected president of the M.I.T. Alumni Club of Fairfield County, and Zay Curtis was elected secretary. Dr. Compton is to speak at our winter meeting. — J. BARTON CHAPMAN, General Secretary, 7 Lalley Boulevard, Fairfield, Conn.

1940

Last July, Tom Creamer received the following good letter from Dave Mowrer, who is working for Armstrong Cork in Djidjelli, Algeria: "In answer to your letter of July 1, I also have noticed that there has been a dearth of news about our Class in *The Review*, and I am one who is among those most at fault; so I'm following your suggestion and including a letter to either yourself or Garry Wright along with my Alumni Fund contribution. I'm afraid that I can't give you any information about anyone else in the Class, because we don't run into many M.I.T. people over here where I am, since there is only one other American besides myself. His son is at M.I.T. now, but that doesn't come very close to us old-timers. So I'll have to be among those who forget their bashfulness and give you some news about myself.

"I've seen very little of the States since 1942 and haven't visited the Institute for even longer than that but hope that next year I'll be able to renew old acquaintances when I come home for two months. I left in July, 1942, with the Army and spent more than four years in Africa, Corsica, and France, and also several months in England (which I almost forgot). While I was stationed in Oran, Algeria, I met the young lady who is now my wife. I returned home last September, and when I went back to my old firm, the Armstrong Cork Company, they informed me that there was an opening for an engineer in the French subsidiary located here. I naturally jumped at the chance and have been here ever since November of last year. There's no use in going into just what I'm doing because it's so varied that I myself am not yet quite sure. The basic job consists of buying raw cork in the forests, or wherever we can lay our hands on it, and then giving it its preliminary preparation before sending it to our main company in the U.S.A. The work is very interesting, and I'm afraid that I'm going to become an Algerian now.

"It's odd, but in all my five years of travel I didn't meet anyone at all from our Class after leaving Fort Belvoir in 1941. There were several of us there, but since then I've seen absolutely no one and am therefore anxious for news and hope that others will follow my example and at least give a bare outline of what they are doing. It would be interesting for me to learn whether there are any of our classmates or anyone else from M.I.T. anywhere in North Africa, or Europe for that matter, because it is not impossible that I may get to France and elsewhere on various occasions. So if you know of anyone who is over here, I should appreciate your telling me, and perhaps we could get together sometime. I notice that the few who do write keep you informed as to the size of their families, and in that respect I have no news, as we are still only two. I hope that you are having a happy married life yourself, and let me offer my congratulations because I don't believe I ever had the chance before."

Kingsbury T. Jackson writes that he is starting a Course X paper and hopes that all the 1940 men in Course X will contribute some news. If you haven't received a letter from him or haven't sent in your information, please do so. His address is

255 West 68th Street, New York 23, N. Y. An anonymous classmate has thoughtfully sent in this news: "Dave Brown is now with the Shell Development Company in San Francisco. His address is 17 Ethel Avenue, Mill Valley, Calif. Abe Buirski, his wife and child, now live at 34 St. Peters Square, London, W.6, England. Abe Pogo is busy with the design of distillation equipment for wine and brandy plants in Italy. John Rittenhouse is an engineer with the Bechtel Corporation in San Francisco, Calif."

Jim Gilman, X, wrote as follows: "Not having kept up very well with the activities of any of our other classmates, I'm afraid I can't be of much assistance in so far as sending along information about anyone else. However, if you are still interested in news of us from us, here are some of the vital statistics concerning yours truly: I have been married since June, 1941, and have two children, Cheryl, two and one-half, and George, three months. My four years of war service were in antiaircraft and infantry, including two and one-half years in the Aleutians and six months in the central Pacific as first lieutenant. I am now doing research and technical service work with the Dennison Manufacturing Company in Framingham, Mass."

We were glad to get this letter from Hurley Bloom: "You had the news of my marriage last year. Now we have a seven-months-old baby, who was born on January 7 and is named Daniel Tolan Bloom. I finished law school here at Harvard in June, took the Massachusetts bar exam on July 3, and am working in the legal department of Lever Brothers in their fine new building at 50 Memorial Drive. My work is concerned mainly with patents. Now that everyone is settling down again, I should be pleased to resume my attempts as Secretary of Course IX if you can send me an up-to-date address list. Perhaps we could make each issue of *The Review* feature 1940 news from a few courses so we could use the 'this is your month' approach. Klivans dropped in early in the month with his wife." We think that the Alumni Association can furnish such a list to anyone who wants it but believe that once the new Register of Former Students is published, a lot of course secretaries will have a good opportunity to send in some news. We should certainly appreciate their help.

George Carnrick writes that he was married to Ruth Walter on June 8. He continues: "We are at Lake Mohawk, N. J., for the summer, then go back to Columbia, where I hope to get my M.S. in June. Beano Goodman has his own company now in Madison, Ind. Loren Wood and his wife Sue were up here visiting us a week ago. He is with International Business Machines in New York City."

George Niles says: "Since leaving Technology in March, 1940, I have been around a little and am now back in the Boston area. The Mead Corporation in Chillicothe, Ohio, first hired me as a development engineer in their research and development department. This company runs quite a string of paper mills. Here I worked on pulping, bleaching, and general papermaking problems until September, 1943. I then went as a chemist to the central re-

search department of the Monsanto Chemical Company at Dayton, Ohio. There I worked on problems connected with textile treatment and detergents. In June, 1945, I was transferred to the Merrimac division, Everett Station, Boston, as a chemist on paper problems. In September, 1946, a formal research group on paper problems was organized, and I was made research group leader. There are now eight beside me in this group. Mrs. Niles and I have three children, Richard, seven years, Robert, five years, and Janet, two years, and this summer celebrated our 10th wedding anniversary. Next door lives Bradford Darling '42, V; and across the street, Manning Morrill '39, X."

Frank Libman sent a letter with this news: "I'm still working for Congoleum-Nairn, Inc., at Cedarhurst, Md., and have been works chemist for almost two years. As reported some time ago, we have one son, David, now aged 21 months, and a new one, William, born on August 29. I've accidentally bumped into several '40 men in Baltimore—Joe Shill, who is working for the Western Electric Company, and Jean Lewis, who is at the Army Chemical Center in Maryland, working as a civilian. I've also spoken by telephone to William Stone, who is now working in New York and living in Cedarhurst, Long Island. This is about all the news I have for you now. I hope that our class reports will be more complete in the future and should like to offer my assistance to you if there is anything I can do to help." Tom suggests that until the course secretaries get organized the most help we can have is by having fellows send in their news to us which we can pass on easily as the above letters for publication in *THE REVIEW*.

John Danforth sent us an announcement of the birth of Dick Dunlap's son, John Hallowell, on March 9. Dick's address is American College for Girls, Arnabulko, Istanbul, Turkey. This is a lot of good news, and we hope you will all keep it up. Thanks for your help.—H. GARRETT WRIGHT, General Secretary, Garrett Construction Company, 510 Sherman Avenue, Springfield, Mo. THOMAS F. CREAMER, Assistant Secretary, 6 Berkley Road, Scarsdale, N. Y.

1942

I haven't received any letters from members of the Class of '42 since the last column appeared. I have had very interesting visits, however, from Jack Williams and Bill Kellogg. Jack, at present, is connected with the electronics department of the International General Electric Company. His job is selling various electronic equipment, with emphasis on radar sets. His work sounds interesting, especially the part which necessitates his taking trips to Europe on business. Jack happens to be up here on a vacation, which he is spending, with his wife, at her parents' home in Manchester. He gave me news of Jack Schultz, who is an engineer at the General Electric Company and is quite highly thought of by the engineering department.

Bill Kellogg, who is now married, is a Ph.D. candidate in Course XVI. He is still in the Army and is being sent to the Institute under Army auspices. Bill tells

me that Bob Shaw is stationed at Wright Field. After graduation from the Institute, he went to Harvard, from which he received an M.D. degree. He is a captain in the Aero-Medical Corps, but, as I understand it, does not plan to make the Army his career. Dick Gibson, who is a major in the Army, is also at Wright Field teaching servomechanisms. Bill Wilcox is at Houston, Texas, working for a Du Pont subsidiary after receiving his master's degree from the Institute last June.

We recently learned that Donald W. Augusterfer was one of the war dead brought back from the Pacific theater in October. He was an ensign in the Navy, and was the first Seabee to die overseas in World War II, on Guadalcanal.

The following members of the Class have been married, or will be, shortly: Mark Kravitz, Arnold C. Fields, Thomas Crowley, Graham Bell, Carl Zeitz, Michael D. Slocum, George Muller, and Ed Pepper. — JOHN W. SHEETZ, Acting Secretary, Room 3-108, M.I.T., Cambridge 39, Mass.

1943

Norman J. Gordon has been appointed senior planner of the Providence City Plan Commission in Providence, R. I. Norm has done considerable work of this type in the past in Cleveland, Montclair, N. J., and for the Tennessee Valley Authority. In 1947, he was in China serving as an adviser to the Ministry of the Interior on a program of city planning. We have heard that Anne and Frank Briber have also taken on a new "job," for on October 28, their daughter, Anne Shilling Briber, was born. So far as I know, the Bribers are still in Milwaukee.

From Cambridge, I learn that Ken Warden and Marjorie Ann Chapin's engagement was announced early in November. Ken is at the Harvard Business School and expects to graduate from there this February. Others at the business school are Larry Stewart and Eliot Payson. Virginia May Humphrey's parents have announced her engagement to Donald M. Powers. The bride-to-be, whose home is in Fairhaven, Conn., attended Wellesley and is now a student at the School of the Museum of Fine Arts in Boston, where she is studying graphic arts. Don, who was an engineer with the Raytheon Manufacturing Corporation in Waltham, Mass., has returned to M.I.T. for graduate work in Electrical Engineering.

The former Vera Cardillo of Roslindale, Mass., and Robert Moore were married on October 11. The Moores spent their honeymoon in Vermont and have made their first home on the County Road in Ipswich, Mass. Bob Moore is currently a math and science teacher in the Ipswich high school. In Ashburnham, Mass., on October 18, the former Althea Quimby and John H. Spencer were married. John is with the General Electric Company in Lynn, Mass.

Next June will mark the fifth year since we donned black robes and mortarboards. It is customary to celebrate this occasion with a class reunion during the graduation exercises, which will be in the second week of June. It has been proposed that we have a stag dinner in Boston and bend the elbows with a few steins of old brew. It would help us immensely if you will send me a

postal card indicating that you will probably come to such a meeting and if you will also indicate where you would suggest we hold the affair. — CLINTON C. KEMP, General Secretary, Barrington Court, 988 Memorial Drive, Cambridge 38, Mass.

1944 (2-44)

The information is rather scarce this month. The latest change of address cards show Charles Adler to be in Yonkers, N. Y.; Bob Allen, in Cohasset, Mass.; Dan Ball, in Arlington, Va.; Jim Barnes, in Detroit, Mich.; Harriet Aldrich, now Mrs. Bering of the Chase National Bank in New York City; Bob Burdick, a commander in the Navy, stationed at the Naval Torpedo Station, Newport, R. I.; Herb Carpenter, in Lindenhurst, N. Y.; Lawrence Dimberger, in Berea, Ohio; Austin Dodge, in Chevy Chase, Md.; Jack Egbert, in Newton, Mass.; Bob Fautot, in Akron, Ohio; Paul Fowler, in Boston; Dick Garrard, in Ballston Spa, N. Y.; John Goldey, in Rochester, N. Y.; Arnold Martin, now at Niagara Falls; Bob Metzger, in Ventor, N. J.; Garry Myers, in Pattonville, Mo.; Harry Myers, in Wichita Falls, Texas.

Stan Warshaw and Edna Hoffman have announced their engagement. She attended Cambridge Junior College and is now studying at Tufts College graduate school. Dick Garrard has up and married Eleanor Barber. She is a graduate of the University of Massachusetts. They will make their home in Schenectady, N. Y., where Dick is working for General Electric. Leland Stanley has married Gloria Cardarelli of Brookline. They will live in Indiana. John Hoopes and Majorie Stone Twombly have announced their engagement. She is a graduate of the Simmons College school of nursing. Jack is now an instructor in chemical engineering at Columbia University.

Ed Walker has gone to Barcelona, Venezuela, to work as geologist for the Mene Grande Oil Company. Rumor has it that Sten Hammarstrom will re-enter Technology this February, since he got out of the Army too late to enter in the fall term last year. — WILLIAM B. SCOTT, General Secretary, McCulloch Hall, D-36, Harvard Business School, Boston 63, Mass. MALCOLM G. KISPERT, Assistant Secretary, Room 3-243, M.I.T., Cambridge 39, Mass.

1947

As we are still relying on press clippings for much of the news of the Class, our information is a little scantier this time. If you want to keep your classmates up to date on your whereabouts, this is your clearinghouse; so please, please drop us a card or letter.

Art Schwartz was up for a brief visit not long ago on the matter of a job interview, and has since written us a letter, from which we quote: "I have begun work at the apparatus research laboratories of the Air Reduction Company in Murray Hill, N. J.; at present I'm operating the machines I watched running while taking 2-371 — it's getting so that a chemical engineer doesn't know what he's going to wind up as. . . . The hours are only 8:30 to 5:10 — and with what they're paying me, it isn't hard to take at all. . . . Since I accepted this job, I got another offer which I had to

turn down; I could almost cry when I think of what that outfit's missing. Give my regards to all the girls."

Bob Warner came up for Christmas shopping from Bridgeport, where he is doing dynamic structural analysis with Chance Vought, and your Secretary had a chat with him over breakfast. He was bubbling over with such enthusiasm for his work that it would appear engineering agrees with him. Bob Bryant, also, was around for a short week-end visit, and spent most of his time glider- and outing-clubbing with his cronies Seaman, Eckhardt, and Hill.

We still see Prexy Norm Holland from time to time, and he reports that things at Harvard Law are progressing in a bully fashion. He has developed a novel method of studying — browning all the week-end so that he can have his week nights free. The advantages of this system somehow are not immediately obvious to those of us who have been brought up for four years on "Saturday nights only." Anyway, he did us a good turn by informing us that classmates Vince McKusick, Bernie Quigley, and Bob Schumacher are also studying for the legal profession.

Wedding announcements are still trickling in; so herewith is the latest on who's whose. Bob Thirkield took Janet I. Wilson of Lowell as his bride, and the couple is now living in Wollaston, although Bob is a sales engineer for the C. W. Torngren Company of Somerville. John Hanson and his bride, the former Susan Gilman of Cambridge, are living in Falmouth; and the Fred Churchleys (Irene Magee of Beverly) are now making their home in Detroit, where Fred has accepted a position as manufacturing engineer with the Mechanical Handling Systems, Inc.

Don Sencenbaugh married Betty Jane Grigsby of Landover, Md.; Don Paster wed Evelyn Tedisky of Providence; and Bob Mack married Charlotte Wallace of Richmond Hill, N. Y. Jason Gordon, who is now employed by United Aircraft Corporation of Stratford, Conn., took his vows with Beverly M. Lander of Pittsfield; Jim Reswick wed Betty Jane Botham of Brookline, and the couple is now making their home in Newtonville; finally Ken Fischbeck married Rita H. Jagiello of Everett. They are residing in New London, Conn. Elizabeth Sackmann, a graduate of Course V, was married to Donald M. Black, who received his Ph.D. from the Institute.

Ed Bowman, who is at present with the Corning Glass Works of Corning, N. Y., is, at last word, engaged to Ann Semple of Wollaston. We have no news of the wedding date, as yet.

Reggie Bobba and his wife, the former Jean M. Corry of West Hempstead, Long Island, are living in West Haven, Conn.; Phil Labombarde, assistant to the chief engineer of the International Paper Box Machine Company, and his wife, the former Frances A. Merritt of Orange, Mass., are living in Nashua, N. H.; and Eldredge Leeming of A. H. Leeming and Sons is making his home in New Bedford, Mass., with his wife, the former Patsy Ruth McLeod of New Bedford. Roger Willcox, one of the Nautical Association's stalwarts, was wed to Elsie van Bueren of Springfield, Mass. Rog, who is now associated with the

Regional Plan Association, Inc., of New York, last summer successfully defended his title as international champion of the "110" sailing class at Marblehead.

I. Franklin McIlhenny '23, has kindly sent us a newspaper announcement of the wedding of Isidro Fong to Lilly Catherine Wong of Colon. The couple honeymooned in Bogota, Colombia, and are now making their home in New Cristobal, Canal Zone.

Clarence Morehouse, dry cell specialist and doctor of philosophy, has accepted a

research position with the Winchester Repeating Arms Company and Bond Electric Corporation divisions of Olin Industries, Inc., and B. L. Averbach, also sporting a doctor's degree, is now an assistant professor of metallurgy here at the Institute. We also have word that Jim Kane has an engineering position with the Kane Manufacturing Company of Louisville, Ky.

Ginny Ferguson is employed as a research chemist with the Monsanto Chemical Corporation in Everett, and we have been see-

ing a lot of her recently as friend Bob Hildebrand has been squiring her to many Technology functions. We notice that Ginny is wearing Bob's fraternity pin, but neither will say any more about it. You may be interested to learn that the Institute is having Open House for the first time since 1942 sometime early in May, so we hope to see many of you there. — CLAUDE W. BRENNER, General Secretary, Box 424A, Graduate House, M.I.T., Cambridge 39, Mass.

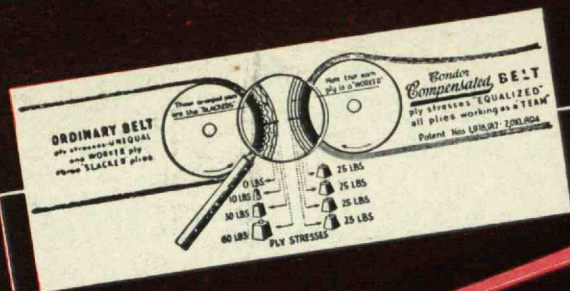
♪ *Arise—Ye Sons of M.I.T.* ♪

Come Back to TECH for ALUMNI DAY

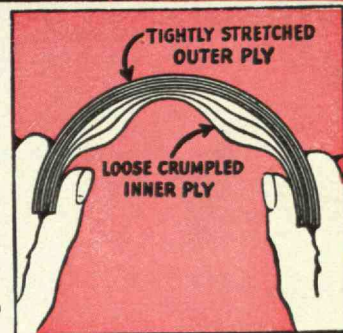
Saturday,
June 12, 1948

♪ *For it's always fair weather*

When good fellows get together ♪



MANHATTAN'S *Condor* COMPENSATION PRINCIPLE no shirkers . . . every ply a worker



It's what happens to a belt when rounding the pulleys that mainly determines the life of the belt. The simple experiment shown here, with cards representing plies of a rubber transmission belt, graphically demonstrates the difference in stress between plies when flexing over pulley circumferences.

EQUALIZED PLY STRESSES IN *Condor* COMPENSATED BELTS

The Compensation Principle developed by Manhattan engineers *has solved the problem* of the top plies being over-worked while the bottom plies just "go along for the ride." Ply stresses are *Equalized* in the manufacture of Condor Compensated belts, so that all Strength Members *pull together* at the point of power delivery.

Among nine proved advantages of the Compensated construction are elimination of outside ply rupture and longer fastener life, freedom from ply separation and less wear on the driving surface. You also have a greater overload capacity, greater margin of safety, and consequently longer service. Send for Bulletin 6808 F, packed with detailed data.

A SINGLE SOURCE FOR A COMPLETE BELTING LINE

Manhattan offers a range of four tensions in driving surfaces on rubber transmission belts. Also Endless Cord, Non-Spark, Oil-Proof and Acid-Proof constructions. Belts can be factory-made endless or field vulcanized by the Condor-Weld method. All Manhattan endless belts have the patented Extensible-Tip outer-ply splice which prolongs belt life considerably. Literature on request.



RAYBESTOS - MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION

PASSAIC, NEW JERSEY

Thomas H. Boyd, '23

Wilder E. Perkins, '25

Charles P. McHugh, '26

Daniel J. Hanlon, '37

Albert W. Beucker, '40

VARIACS for

Smooth VOLTAGE CONTROL

● THE VARIAC* — the original continuously-adjustable auto-transformer — is the ideal device for controlling any a-c operated equipment. VARIACS not only supply perfectly stepless control of voltage from zero, but also supply output voltages 17% above line voltage. VARIACS are correctly designed for many years of trouble-free operation. Data below are for single-phase operation. Polyphase assemblies are available.

SINGLE-PHASE DATA

OUTPUT

LINE VOLTAGE	RATED AMPS.	MAX. AMPS.	OUTPUT VOLTAGE	KVA	CASE	TYPE	PRICE
115	1	1.5	0-115 0-135	.170	(1)	200-B	\$12.50

TYPE 200-B

115	5	7.5	0-115 0-135	.862	(1) (2) (3)	V-5 V-5M V-5MT	18.50 20.50 25.00
230	2	2.5	0-230 0-270	.575	(1) (2)	V-5H V-5HM V-5HMT	21.00 23.00 27.50

TYPE V-5

115	10	15	0-115 0-135	1.725	(1) (2) (3)	V-10 V-10M V-10MT	33.00 35.50 40.00
230	4	5	0-230 0-270	1.15	(1) (2) (3)	V-10H V-10HM V-10HMT	34.00 36.50 41.00

TYPE V-10

*The trade name VARIAC is registered at the U. S. Patent Office. VARIACS are patented under U. S. Patent No. 2,009,013 and are manufactured and sold only by General Radio Company or its authorized agents.

115	20	30	0-115 0-135	3.45	(4)	V-20M	55.00
230	8	10	0-230 0-270	2.3	(4)	V-20HM	55.00

TYPE V-20

- (1) Unmounted model.
- (2) Protective case around windings.
- (3) Protective case, terminal cover, line switch, convenience outlet and 6-foot line cord.
- (4) Protective case, terminal cover and BX outlet.
- (5) Two gang assembly — requires type 50-P1 Choke — \$10.00

115	40 80	45 90	0-115 0-135	5 10	(4) (5)	50-A 50-AG2(5)	140.00 310.00
230	20 40	31 62	0-230 0-270	7 14	(4) (5)	50-B 50-BG2(5)	140.00 310.00

TYPE 50

GENERAL RADIO COMPANY

Cambridge 39, Massachusetts